# THE MEDICAL NEWS.

A WEEKLY JOURNAL OF MEDICAL SCIENCE.

VOL. LXXVII. NEW YORK, SATURDAY, NOVEMBER 10, 1900. NO. 19.


## ORIGINAL ARTICLES.

### SOME OBSERVATIONS ON ANESTHESIA BY INTRASPINAL INJECTIONS OF COCAINE.[1]


BY S. ORMOND GOLDAN, M.D.,

OF NEW YORK.


HAVING used the lumbar puncture and injection in over twenty cases, covering a variety of operations in general surgery, gynecology, and obstetrics, it is rather to be expected that, as an anesthetist, I would make comparisons of the new method with our general anesthetics, nitrous oxide, ether and chloroform.

That intraspinal cocainization would be superior to general anesthetics as administered in many cases, there is no doubt. That it is superior either in safety or advantages to our three general anesthetics properly selected and skilfully administered, I for one do not believe. My opinion is not based upon purely theoretical grounds, but upon a considerable practical experience in the administration of general anesthetics and an experience in the intraspinal method of anesthesia which, while less extensive than that of others, perhaps, is none the less thorough in the observations recorded.

While my results were at variance with others recorded in this vicinity, it has been a matter of satisfaction to find they were practically the same as those of the operators who first used the method for surgical purposes. I refer to Bier and Tuffier and, recently, those who at first questioned my technic.

It is my purpose to call attention to some salient features usually passed over by other investigators. First, it may be of interest to see the armamentarium complete. This consists of needles, aseptic solid piston syringe, one 120 m. graduate, small medicine glass for cocaine solution, test-tubes containing sterile cotton, forceps; sterile water in a tube covered by a sterile finger cot, effectually avoiding the loss of the fluid, at the same time keeping it uncontaminated; a small bottle of collodion, adhesive strips, a small piece of Arkansas oil-stone, alcohol lamp, powders of cocaine hydrochlorate, grs. 1¼ each, first wrapped in paper, then covered with foil and carried in a wide-mouth, glass-stoppered bottle large enough to hold about six. These are all tightly packed in a copper sterilizer, 8 x 6 x 2. I advise that they never be used for any other purpose.[2]

The needles should be neither too large nor too small in caliber. The attenuated needles and stylets devised by me are made of gold drawn, rendering them for this purpose second only to steel with none of the latter's disadvantages. The measurements are 8 and 10 centimeters respectively in length. External diameter of larger part, .9 millimeter. Internal diameter of larger part, .8 millimeter. External diameter of attenuation, .8 millimeter. Internal diameter of attenuation, .4 millimeter.

The attenuation, the essential part of the needle, is three centimeters from the point, which has a short bevel. It will be noticed that the measurements of these needles are smaller than those recommended by Tuffier. In no instance have I failed to obtain the cerebrospinal fluid nor have the needles up to the present ever become stopped up—it can readily be seen that were this to happen the stylets would very quickly and effectually clear them. Devices for causing a vacuum in the needles as they pass through the tissues are rather a disadvantage as they tend to draw foreign materials into them which would not ordinarily occur. The trocar and screw-nut of Corning's are quite unnecessary. The smaller the opening in the integument, everything else being equal, the better.

In most instances the line uniting the iliac crests in the mid-point of the back skirts the lower border of the spinous process of the fourth lumbar vertebra; at times it passes through the middle of it. The practical point to remember, whether it passes through or just below it, is that it is the fourth vertebra and the site of puncture is between this and the fifth, not more than 1 cm. external to it on the right or left side. If the needle is directly in the space between the contiguous vertebræ it need only be pushed in from without inward. It is only when it is introduced too low that it impinges upon the lamina of the vertebra below; it must then be depressed and also pushed from below upward to enter the spinal canal. The punctures have been made by me with such extreme ease that I can tell the instant it enters the interlaminar ligament and membranes of the cord and the moment the fluid will appear. The needle should be thrust through the skin quickly; then, giving the patient time to recover from the slight shock, it is gradually pushed inward, bearing in mind, the direction until the subarachnoid fluid appears. This should not be allowed to drip away; but the syringe filled with the required quantity of cocaine solution is adjusted to the needle and the cocaine slowly injected, about one minute being consumed in doing it. The needle is not immediately withdrawn, but is al-

[1] Read before the Section on Obstetrics and Gynecology of the New York Academy of Medicine, October 25, 1900.

[2] For a complete description of the technic see the author's paper read before the New York State Medical Association, October 18, 1900, and published in the *Philadelphia Medical Journal*, November 3, 1900.

lowed to remain *in situ* about two minutes. It should be distinctly remembered that my observations are based upon the injection of 20 m. of a two-per-cent. solution of cocaine, the injection being sometimes repeated, but never more than once.

Anesthesia appears in from two to twenty minutes and is evinced usually by a paresthesia in the lower extremities variously described by different patients. Some are not cognizant of this paresthesia until the effort is made to rise from the chair; they then imagine they cannot move. Motion is not impaired, however, for when they are told to bend the legs, etc., in most instances they can readily do so. Anesthesia in my experience frequently extends to the axilla, occasionally to the clavicle, at other times to the lower ribs or umbilicus, the middle of the thighs or only to the ankles; it is usually symmetrical, occasionally higher on one side than on the other; in one case it was present upon one side only and this from the buttock down along the posterior aspect of the thigh and leg to the ankle and across the instep and the whole sole of the foot.

In some patients well-developed paresthesia was noted in the upper extremities in one of these. The patient was in the Trendelenburg position. Sensation to pin-prick was present, however.

The duration of anesthesia varies in different patients, the longest period being three hours. I doubt, however, if it was sufficiently complete to be available for surgical purposes; in most instances no doubt it would be for operations on the lower extremities; in abdominal operations patients who still have anesthesia in the lower extremities have decided sensations during manipulations toward the end of the procedure. An anesthesia for an abdominal case lasting one and one-half hours in my estimation would be long. Anesthesia often passes off much sooner, in one case it lasted but forty minutes.

Muscular relaxation is very complete; the sphincters often lose their tonicity, in one case the rectal contents were forcibly expelled during vomiting. Voluntary contraction of muscles is present; expulsive effort is not impaired. The respiration in all patients is increased, frequently doubled, the normal rate usually varying between 24 and 30, at times shallow, at other times full; one patient had evident air hunger, but this quickly passed off. The pulse immediately after injection is always increased in frequency, usually about 120—at times higher; sometimes it is small and often within a half hour falls as low as 60 and becomes full; sometimes it is irregular; it then increases in frequency to something above the normal rate. The decrease in the pulse is not followed by a like decrease in the respiration. Less than half the patients had nausea and vomiting. When it did occur it came on at times soon after the injection and sometimes half an hour after. In one case nausea was very intense. It usually quickly ceased, but occasionally occurred the following day. Many patients exhibited marked pallor of the face with a slight cyanosed condition about the lips and tips of the fingers; later on the face became suffused, showing a decided contrast to the previous condition. The pupils in most instances were normal, at times slightly dilated but never markedly so; the rather darkened condition of the room could account for the slight dilation. Occasionally the pupil was contracted, particularly so in one case after a hypodermic injection of morphine. Perspiration more or less profuse occurred in all but two cases. I attribute this to paralysis of the sympathetic similar to that caused by general anesthetics. The temperature sometimes rose as high as 103° F. There was some rise of temperature in more than half the cases. In one patient it reached 103.4° F., but as there was a pus pocket associated with the case the surgeon attributed the temperature to that. After this was opened the temperature gradually approached the normal. Headache in the occipital or frontal or temporal regions occurred in half the patients; in four it was very intense; in the others only moderately so. In most of the patients it passed off in twenty-four hours, leaving a dull feeling about the forehead. Some of the patients had slight rigors and a condition of restlessness the following day, with dull aching in the bones, particularly of the lower extremities. Two of the patients had muscular rigidity of the muscles of the back and of the back of the neck; in one patient this persisted for a week.

Some of the patients were entirely free from all subjective symptoms. Anesthesia failed entirely in three cases, in two of which more than half a grain of cocaine was injected. In others anesthesia was partial; in still others a second injection produced satisfactory anesthesia. Marked toxic symptoms developed in one patient, an obstetric case. The respiration was gasping, shallow, and 60 to the minute; pulse 140, small and irregular; profuse perspiration; muscular tremors; face absolutely colorless, pupils contracted. This patient had very intense headache for two days following the injection.

Deductions based upon my own experience and also the reports of other investigators which do not materially differ from mine can be summed up as follows:

1. Cocaine introduced into the subarachnoid space acts in the same way as it does when injected into the general circulation, being, possibly, less toxic.

2. There is no definite quantity which will answer in all cases. Some are easily influenced by small doses, whereas others require large amounts to produce the desired effect.

3. Temperament, type of patient, and condition of health do not seem to influence the action of the drug. Large, healthy individuals are often affected by small doses, whereas the sickly, emaciated types often require second injections to produce anesthesia.

4. There is no method of determining how

any particular dose will act in a particular case.

5. Large doses should never be used until the individual susceptibility is determined.

It is singular that when a first injection produces no anesthetic effect it also produces slight physiological symptoms. A second injection may then be made with safety. When anesthesia is but partial a second injection may be made, this to be less, however, than the first.

This is the only practical and safe plan to be followed in all cases. Differing in no way from toxic drugs introduced into the general circulation, it has been said that a large dose, say of morphine, often produces the desired effect when a small one does not. This is quite true. I do not believe any one would introduce what might be a toxic dose of morphine without first ascertaining the patient's individual susceptibility. Cocaine differs in no way from morphine in this respect. In a case reported by Boldt[1] some years ago the injection of a few drops of a four-per-cent. solution produced very toxic symptoms which almost caused death. Cocaine was just beginning to receive attention as a local anesthetic. A patient with supraorbital neuralgia had injected 15 m. of a four-per-cent. solution of cocaine. There was first observed redness of the face, then vertigo, increased pulse with diminution of volume, frequent short respirations and distress about the region of the heart; after two or three minutes the patient fell unconscious to the floor. Respiration ceasing entirely, artificial respiration was employed and the patient restored after fifteen or twenty minutes. Respiration became spontaneous to the extent of 5 or 6 to the minute, deep and sighing; pulse weak; pupils dilated, without reaction to light; conjunctivæ sensitive however. Previous to regaining consciousness there was observed spasmodic contraction of the upper extremities. Speech was incoherent and after one hour the patient walked with unsteady gait. The neuralgia was absent for three days; then a second injection was made at the urgent request of the patient, 10 m. of a four-per-cent. solution were injected and the symptoms occurred in exactly the same order, only not lasting so long. A third injection of 5 or 6 drops produced vertigo, dyspnea, oppressive feeling about the heart; the symptoms disappeared in a few minutes. Boldt's experimental researches upon animals differ more in degree of intensity of symptoms than kind; the latter were very similar to those which developed in the obstetric patient before mentioned.

Whether intraspinal cocainization will prove to be more valuable in obstetrics than in general surgery, time alone can tell. The marked toxic symptoms and the disagreeable after-effects may be found to more than offset any advantages which the method may possess. It is probably not generally known that cocaine was used locally in obstetrical cases by Dr. Polk of this city fourteen years ago. An interesting account of his experience with it appears in Knapp's monograph on "Cocaine," published by G. P. Putnam's Sons. The injection of 4 m. of a four-per-cent. solution of cocaine into the anterior and posterior lips of the cervix produced anesthesia for one hour during the first stage of labor, during which time the patient complained only of discomfort over the symphysis and of some dull pain over the sacrum; the cervix could be stretched freely without causing pain. During the second stage injections were made in the vaginal walls along the course of the distribution of the pudic nerves, and the results were so far satisfactory that the child's head passed out of the vagina with so little discomfort that the patient uttered no complaint. Dr. Polk told me the method fell into disuse because it offered no advantages over chloroform.

It has been said that intraspinal cocainization has produced no mortalities. I believe Tuffier reports at least one case in which the patient died of asphyxia which can be attributed to cocaine. It is no more than just, however, to state that the safest anesthetic introduced would eventually have deaths attributed to it, but fatalities occurring during narcosis are not necessarily due to the anesthetic.

How does the method compare with our general anesthesics? Retention of consciousness is said to be one of the advantages. Were this question canvassed among patients generally the vast majority would prefer to know nothing while being operated upon. It is said to be advantageous in cardiac disease. It has so frequently been my office to administer anesthetics to patients suffering from organic cardiac disease with such satisfactory results that I can see no advantage in this method over ether or chloroform properly selected and administered. In fact, I would consider cocaine less safe because of its marked circulatory involvement. It is not so much the organic lesion as the character of the heart's action which indicates whether a patient is apt to behave well under general anesthesia.

Absence of pneumonia and nephritis is another advantage mentioned. Were every patient who takes a general anesthetic to develop these complications there would be no question but that intraspinal cocainization would be the method *par excellence*. As a matter of fact, pulmonary and renal complications are rare following general anesthesia, particularly so when properly administered.

In certain forms of renal disease intraspinal anesthesia would undoubtedly be safer than ether or chloroform. Take, for instance, a patient with a well-developed nephritis, a secondary bronchitis and irregular heart-action; while ether properly administered would no doubt stimulate the heart, it would be obviously unsafe for the kidneys and lungs; chloroform would be selected as the safest anesthetic; in spite of every precaution renal suppression occurs. Spinal

[1] *New York Medical Press*, 1885-6, p. 105.

anesthesia would be the safest method in such a patient and I would have no hesitancy, providing nitrous oxide and oxygen were not applicable, in advising its use in preference to ether or chloroform, for I have seen just such suppression occur when chloroform as well as ether was being employed as a general anesthetic. Fortunately, however, such cases are extremely rare, but the possibilities should always be borne in mind by the surgeon and anesthetist.

When the patient has an ungovernable fear of general anesthetics and refuses to have them administered, the status of intraspinal anesthesia may be stated to him and it may be used providing he prefers it and fully comprehends the dangers of the method.

In spite of every precaution in technic failure to produce anesthesia does occur. This is most frequently and I think improperly attributed to the boiled solution. It is questionable whether cocaine freshly prepared and boiled one minute is rendered inert. A decided disadvantage is the uncertainty as to the time anesthesia will last. No more deplorable condition is conceivable than to have the anesthesia pass off during an important part of an abdominal operation. The method should not be used in minor cases where the puncture and injection are in magnitude altogether out of proportion to the operation.

To sum up: To me, with the experience gained to date—I shall, however, have no hesitancy in altering my views should further observation warrant it—anesthesia by intraspinal cocainization will have a place in surgery not as the method for general use, but when for various reasons general anesthetics should or cannot be administered. While this does occasionally occur, it is exceedingly rare. There are few patients requiring operations who cannot take one or the other of our three general anesthetics. I see no reason to change what is in my estimation the order of safety of anesthetics except to add to the end of the list intraspinal cocainization. This may be stated as:

1. Nitrous oxide and oxygen.
2. Nitrous oxide and air.
3. Ether preceded by nitrous oxide.
4. Ether alone.
5. Chloroform preceded by nitrous oxide and ether.
6. Chloroform preceded by ether.
7. Chloroform alone.
8. Intraspinal cocainization.

With reference to 5, 6 and 7 it is my belief that 75 per cent. of the early fatalities from chloroform could be prevented by the preliminary administration of gas and ether or ether alone.

When intraspinal cocainization has been used with a mortality comparable with nitrous oxide and ether, then and not until then will we be in a position to definitely assert that it can be safer than that most generally useful and safe combination of anesthetics.

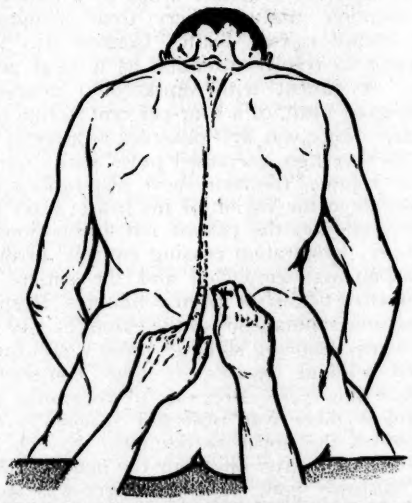
225 West 45th Street.

## FURTHER EXPERIENCE WITH SUBARACHNOIDEAN INJECTIONS OF COCAINE FOR ANALGESIA IN ALL OPERATIONS BELOW THE DIAPHRAGM.

By JOHN B. MURPHY, M.D.,
OF CHICAGO;
PROFESSOR OF SURGERY AND CLINICAL SURGERY IN THE NORTHWESTERN UNIVERSITY MEDICAL SCHOOL; SURGEON TO THE MERCY HOSPITAL, ETC.

THE history of subarachnoid cocaine anesthesia is familiar to readers, and it is unnecessary to consider it in this article. We wish to mention the practical results of this procedure from a clinical standpoint, after considering its technic. Its administration in the great majority of cases is easy. The patient is placed in a sitting posture, with the body bent sharply forward so as to separate the spinal laminæ as much as possible. The skin, having been sterilized in the usual way, a needle, two and a half inches in length, with a short bevel, is inserted between the

FIG. 1.

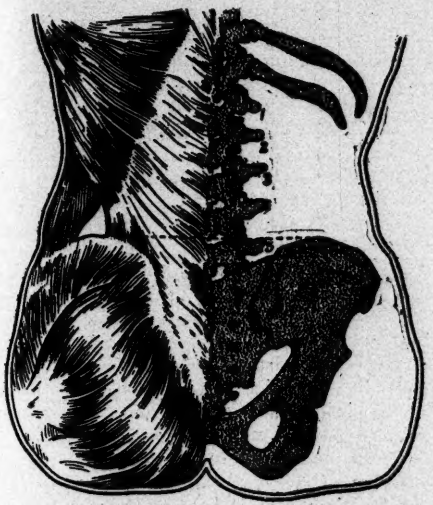


The patient sits upon the edge of the table; the operator having previously localized the iliac crests, with the left index finger he locates the spinous process corresponding to the bi-iliac transverse line. The needle is inserted with the right hand 1 cm. in front of this apophysis. (Cut after Tuffier.)

fourth and fifth lumbar vertebræ. The thumb should be placed upon the spinous process of the fourth, so that its tip passes a little below and to the left of the process. The needle is then inserted directly forward, not tilted upward, until the resistance of the interlaminal membrane is encountered. When the needle is pushed slowly through this the cerebrospinal fluid escapes, sometimes in drops and sometimes in a stream. The syringe should now be connected, and fifteen minims of a one-and-one-half or two-per-cent. cocaine solution slowly injected, a process requiring from thirty to forty seconds. The needle is then withdrawn, and the opening closed with collodion. The patient is placed in the recumbent position and preparations made for operation. The analgesia is complete in from six to eleven minutes in all cases.

The dangers of failure in technic are: (1) The cocaine solution may not be fresh, and therefore may have lost its analgesic properties. It must be borne in mind also that cocaine undergoes

FIG. 2.



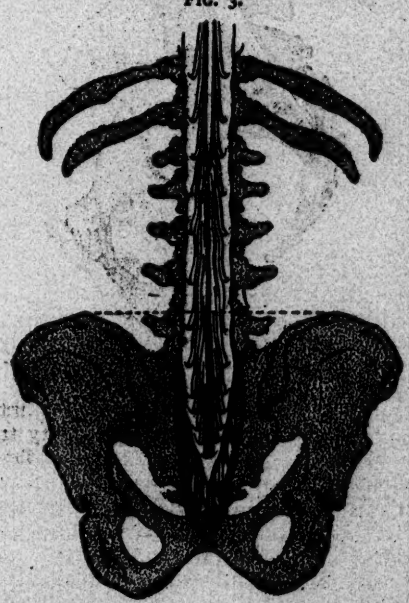
The broken line shows the vertebra corresponding in position to a horizontal line extending from the uppermost point of one iliac crest to that of the other posteriorly. (Cut after Tuffier.)

decomposition when boiled. (2) The needle may escape from beneath the dura, or be forced through the dura in making the connection of the barrel with the needle. In that event the fluid would escape in front of or behind the dura, and no analgesic effect would follow. When the needle is being inserted, if the interspace is not penetrated in the first effort, it should be partially withdrawn and its direction changed a number of times, as it is likely to become filled with blood, which coagulates and does not allow the cerebrospinal fluid to escape even though the tip be within the canal. In such instances the needle should be removed and washed out with sterile water. In my recent cases I have filled the needle with cocaine solution before inserting it, water answering the purpose just as well, and placed my finger over the end of the needle, so that no blood was admitted into the needle until I felt that I had penetrated the dense membrane between the lamellæ. I believe I have saved myself the annoyance of changing the needle a number of times by following this plan. A fairly strong needle should be used, as in muscular patients its direction is changed very much by the spasm of the muscles when the needle is inserted. I always tell the patient that a needle puncture is to be made; that he will not be unconscious; that he will know everything that is going on, and still he will have no pain.

I wish to call particular attention to Case XXIV., as it emphasizes the importance of a fresh solution. There was also one case in which I was unable to find the interspace between the laminæ, as the patient could not be placed in a sitting position, and his back was somewhat deformed on account of ankylosis.

The manifestations, after the injection, as given by the patient, occur in the following order and at about the average time herewith given: A sensation of numbness in the feet and legs comes on about four minutes after the injection. This rapidly extends up to the trunk and as high as the costal arch. Five minutes after the injection the patient complains of thirst, a tingling in the tongue, a sensation of anxiety in the precordial region, and a sense of heat. From eight to twelve minutes after the injection many of the patients are nauseated; some of them vomit. Six or seven minutes after the injection there is usually a slight increase in the pulse. In some cases it is very pronounced from the moment of the injection, and even preceding it, due to the nervous condition of the patient. In all of the cases cited, except Case XXIV., the analgesia was perfect, and all have progressed to uninterrupted recovery without the least complication. After the patients were removed from the operating-room there was no nausea nor emesis in any of the cases, and it was gratifying to notice the excellent condition of the patients on the evening of the operation. Even the patients upon whom laparotomy was performed were much better than those in whom a general anesthetic had been used.

FIG. 3.



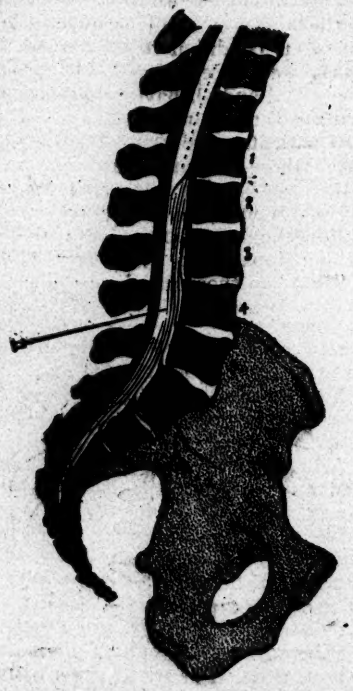
The broken line shows the distance existing between the needle and the spinal cord when the arachnoidean cul-de-sac is penetrated. The spinal cord terminates at the lower border of the body of the first lumbar vertebra. (Cut after Tuffier.)

As the anesthesia is probably due to a local effect upon the posterior nerve-roots and not to absorption, the solution being diluted immediately with the cerebrospinal fluid, I have very much

less apprehension than I had when it was first suggested or when I first saw it used. There has not been a single case of depression of the pulse to the extent which I observed in Tuffier's clinic. Whether this is due to the cocaine or to a difference in the patients, I do not know; but the clinical fact remains that for minor operations, such as operations upon the foot, leg, knee, thigh, and hip, I believe that ten minims of a two-per-cent. solution will be sufficient.

The indications for cocaine cannot be given at the present time from a clinical standpoint. However, I would say that for the operations of strangulated hernia, intestinal obstruction, crushing injuries of the lower extremities, compound fractures, dislocations, operations on the

FIG. 4.




The needle can be seen in the arachnoid space; the nerves being laterally situated are not in danger of injury. (Cut after Tuffier.)

perineum, vaginal hysterectomy, and in intra-abdominal operations when the respiratory tract or the kidneys are at all impaired, cocaine should be the anesthetic of election, as far as we understand it at the present time.

The cocaine may be secured from the manufacturers in solution in vacuum-glass ampullæ, in which it will keep perfectly for two months, or in dry anhydrous crystals in glass ampullæ, marked, containing fifteen minims and thirty minims in amount, to which sterile water may be added at the time of administration. This insures the efficacy of the cocaine and the sterility of the medium.

The syringe should have a slide and not a screw connection, as in twisting the barrel one is likely to dislodge the tip of the needle from beneath the dura.

We do not use this method of anesthesia in every case, either in clinics or in private practice, but each week its range of usefulness is increasing as confidence and security are assured by the results.

Since my return from the International Medical Congress, August 19th, I have used this method of anesthesia in twenty-five cases, with the following results:

*Case I.*—Miss B., Cook County Hospital, aged twenty-two years; left pyosalpinx, with history of rupture into the intestines. Injection of 15 minims of a two-per-cent. solution of hydrochlorate of cocaine in the subarachnoid space in the lumbar region on a level with the iliac crests. The needle was easily inserted, the cerebrospinal fluid escaped, and about forty seconds were consumed in injecting the fluid after the syringe was connected. The opening, when the needle was withdrawn, was sealed with collodion. The operation was begun eight minutes after the injection. A medium incision was made; the adhesions were very extensive and firm. It was difficult to separate the tube from the bowel. The wall of the latter was enormously thickened, and I feared that a sinus was present. Careful examination, however, did not reveal one. The tube was removed, the pus sponged out, and the omentum drawn over the intestine and pressed down into the pelvis, as the sigmoid was fixed and could not be turned down to protect the abraded surface. The operation was completed by closing the abdomen with figure-of-eight sutures. No drain. The patient was conscious of the fact that she was being handled, but there was not the slightest pain. She was nauseated and vomited six times after the operation was begun, retarding the work a couple of minutes. The pulse at no time exceeded 75 and ranged from that to 60. She did not vomit after the operation. Her temperature that evening reached 102° F.; since then it has been normal and no unpleasant symptom has occurred.

*Case II.*—Male, aged fifty years, Cook County Hospital. Varicose veins of the leg; Schede operation. Thirteen minims of cocaine. A two-per-cent. solution was used for injection. Anesthesia complete in seven minutes. Some nausea and vomiting during the operation. Anelgesia perfect. The pulse was not accelerated and was strong at all times.

*Case III.*—Male, aged forty-six years, Cook County Hospital. Sensitive ulcerated stump following amputation for diabetic gangrene. In this case 15 minims of eucaine solution were injected. A little difficulty was experienced in getting the needle between the laminæ. Some nausea and vomiting occurred as with cocaine. It was twelve minutes before the analgesia was complete, and there was some return of sensation ten minutes after the operation was begun. On the whole, it was not as satisfactory as cocaine.

*Case IV.*—Female, Cook County Hospital;

small tumor of left ovary in a very neurotic patient. Injection of 11 minims of a two-per-cent. solution of cocaine. Nine minutes after the injection the analgesia in the abdominal wall was complete. An incision was made, the ovary and tumor removed in the usual way; abdomen was closed with a figure-of-eight suture. Eighteen minutes after the injection there was one effort at vomiting. The patient said she had a sense of nausea. The insertion of the needle did not give the slightest pain. Her extremities from the toes to the hip were tested with needles. The sense of touch was present, but no pain was produced by the prick. There was no vomiting after the operation. The patient's pulse was 120 before the operation was begun, and 90 when it was completed. Time, twenty-one minutes from the injection to the completion of the operation.

*Case V.*—G. B., aged eight years, Alexian Brothers' Hospital, September 11th, appendectomy. Intermediate operation; 15 minims of a two-per-cent. solution of cocaine injected. Complete analgesia in nine minutes. Transrectus incision; appendix postcecal; separated from caput coli by pathologic amputation; removed; closed without drain. Pulse before operation, 150; when abdomen was opened, 140; remaining so during the operation of ten minutes. One effort at vomiting twelve minutes after the injection. No vomiting after operation. Temperature same evening, 99° F.

*Case VI.*—I. S., aged fifty-one years, Alexian Brothers' Hospital, September 11th. Arthrectomy left knee-joint; traumatic synovitis; 15 minims of a one-and-one-half-per-cent. cocaine solution injected; analgesia in eleven minutes. Nauseated; vomited fourteen minutes after injection; pulse 140 all the time; very neurotic patient. Temperature same evening, 99.6° F. No unpleasant after-effects.

*Case VII.*—Male, Alexian Brothers' Hospital, September 11th. Suppurative epididymitis; curettement. Injection of 12 minims one-and-one-half-per-cent. cocaine solution; analgesia in seven minutes; nausea; vomited once thirteen minutes after injection; pulse rapid all of the time, before, during and after the operation. Temperature, 100.6° F. the evening after operation. No unpleasant symptoms.

*Case VIII.*—O. H., aged fifty-eight years, Alexian Brothers' Hospital, September 11th. Schede operation. Varicose ulcer of leg. Injection 15 minims of a one-and-one-half-per-cent. cocaine solution. Analgesia of lower extremities in seven minutes. Nausea and slight vomiting. Pulse never above 90. Patient phlegmatic, had no apprehension of pain, discomfort or danger from the operation, contrasting markedly with the previous cases. Temperature, 99.4° F. on evening after operation. It will be noted that in all cases operated on September 11th the evening temperature exacerbation was absent.

*Case IX.*—H. P., aged thirty-five years, Alexian Brothers' Hospital, September 12th. Strangulated femoral hernia of fifty-four hours' duration. Injection of 15 minims one-and-one-half-per-cent. solution. Analgesia in eight minutes. Usual incision, intestine liberated, gloss was present, circulation slowly returned, resection unnecessary, sac excised and femoral canal closed with kangaroo tendon. Patient vomited before injection and frequently during operation. The vomitus was that characteristic of obstruction. Pulse was 130 before injection, reached 144 during operation, was 120 at completion of operation and fairly strong all of the time. Duration of operation, twenty-two minutes. The patient had no pain or inconvenience at any time during the operation. His bowels moved freely on the table. He said he felt better than at any time since the onset of his illness.

I believe cocaine has very decided advantages in cases of intestinal obstruction; *first*, the patient is quickly prepared for operation; *second*, the danger of inhalation-pneumonia is *nil*, a matter of grave importance; *third*, the prolonged depression so general in this operation from general anesthesia is avoided.

The following cases in my service were by Drs. Lee, Oswald, and Neff:

*Case X.*—Patient sixty-two years old; suprapubic cystotomy. Fifteen minims of a one-and-one-half-per-cent. cocaine solution; patient did not vomit and the introduction of the sound did not give pain.

*Case XI.*—Patient fifty-six years of age; papilloma of rectum; 15 minims of a one-and-one-half-per-cent. cocaine solution; sphincter ani dilated; perfect analgesia; no vomiting.

*Case XII.*—Patient aged forty-two years; varicose veins of leg; Schede; 15 minims two-per-cent. cocaine solution; nausea.

*Case XIII.*—Patient's age not given; inguinal hernia, radical cure; 15 minims one-and-one-half-per-cent. solution; no vomiting; no pain.

*Case XIV.*—Aged thirty-four years; inguinal and umbilical hernia; 20 minims of a one-and-one-half-per-cent. solution; time for both operations, 45 minutes; nausea; no vomiting.

*Case XV.*—Male, aged twenty-six years; cystoscopy of bladder; 15 minims of a one-and-one-half-per-cent. cocaine solution; some nausea; no vomiting; time of operation, 35 minutes. The prostatic portion of the urethra gave an unpleasant sensation, though no pain.

*Case XVI.*—Male; carcinoma of penis; amputation and removal of inguinal glands, both sides; perfect analgesia; some nausea and efforts at vomiting.

*Case XVII.*—Extensive burn of the thigh; terminal growths; 40 square inches; 15 minims of a two-per-cent. solution; complete analgesia in nine minutes; some nausea; no vomiting.

*Case XVIII.*—Female, aged fifty-nine years; intra-uterine polypus; dilatation, removal of polypus, curettement; analgesia in seven minutes; pulse 74 at the highest; no nausea; no vomiting.

*Case XIX.*—Female; retroversion; polypus; small cyst of ovary; 15 minims of a two-per-

cent. solution; analgesia in eight minutes; laparotomy, removal of cyst of ovary, ventral fixation; considerable vomiting due to the fact that a four-per-cent. solution was imperfectly mixed with sterile water to make it of two-per-cent. strength; time of operation 15 minutes; not the slightest pain at any time.

*Case XX.*—Mrs. X, aged thirty-four years; large uterine myofibroma. Abdominal myomectomy; 15 minims of a two-per-cent. cocaine solution. In nine minutes analgesia was perfect; median incision. Enucleation of fibroid from uterine wall; double row of silver catgut sutures of uterus; closure of abdominal wall with silkwormgut. No vomiting; analgesia perfect; highest pulse 94. Patient said, "It is just play compared with taking chloroform."

*Case XXI.*—Male; ankylosis of hip; ununited fracture of femur. It was impossible to put patient in the sitting position and I was unable to insert the needle with the patient on his side. The attempt was abandoned.

*Case XXII.*—Male, aged thirty-seven years; hemorrhoids; 15 minims of a two-per-cent. solution. In seven minutes the analgesia was complete. The sphincter was stretched without the slightest manifestation of pain or reflex. Tumors removed with cautery and without pain. No nausea and no vomiting.

*Case XXIII.*—Male, aged twenty-four years, Mercy Hospital; large varicocele; phlebectomy; 12 minims of a two-per-cent. solution (two months old, but in a vacuum-glass ampulla); analgesia was complete in seven minutes; more nausea than usual; no vomiting; complained of sense of heat in chest; pulse 92 at highest; somewhat diminished in force and volume. I saw him an hour after operation and he said he never felt better in his life. No headache or other unpleasant symptoms followed.

*Case XXIV.*—Mrs. X., aged twenty-six years; Cook County Hospital; acute appendicitis; abscess rectocecal; small appendix removed. Injection of 15 minims of a two-per-cent. solution of cocaine; after ten minutes not the slightest analgesia; no nausea or sense of numbness; no anxiety. Investigation showed that the interne had used an old solution of cocaine which had decomposed from standing. The two bottles were just alike and the mistake was pardonable. I did not dare to use another injection on the same patient, but used the fresh solution immediately on the next case with positive results.

*Case XXV.*—Mrs. F., aged fifty-two years; Cook County Hospital; tubercular tendovaginitis, dorsal tendons left foot; extensive dissection of the tendon sheaths; injection of 13 minims of two-per-cent. solution of cocaine, fresh; complete analgesia; no nausea and no vomiting; no cardiac pneumonia; patient felt perfectly well after removal to room. This is a beautiful contrast to the previous case, showing the importance of fresh cocaine solution, or one, at least, that has been free from bacterial action.

## THE EXAMINATION OF STOMACH-CONTENTS.

By W. A. BASTEDO, PH.G., M.D.,
OF NEW YORK.

NEW laboratory methods when first propounded are apt to repel the general practitioner, because the practical application of them is difficult and the value of their findings not yet established. He does not see how he can use them in his own practice, although he may recognize their value in the hands of the specialist. Yet as time goes on the methods become simplified, a few tubes and solutions replace the early complicated and extensive apparatus, and the results become more definite and of more real diagnostic significance. Then only can the busy practitioner without laboratory facilities begin to use such methods for the benefit of his patients. It is thus that the examination of stomach-contents, which until recently has been carried on only by stomach specialists and clinical chemists, has become an easy undertaking. It is true that among the many processes outlined in works on the stomach no stress is laid upon the value of the simpler methods which can be put into daily practical use, and the reader is made to feel that he must not only be possessed of excellent chemical technic and a compound microscope, but must also expend much time and labor if his examination is to be of any value. That this impression is a mistaken one and that thanks to the realization of its diagnostic significance in internal medicine, the examination of stomach-contents can now be performed by the general practitioner without elaborate apparatus or the loss of much time, I propose to demonstrate.

The simplest and best test-meal consists of a good-sized hard breakfast roll without butter, taken when the stomach is empty, thoroughly chewed, and washed down with twelve ounces of water. At the end of an hour a stomach-tube is passed and through it the stomach-contents are voluntarily vomited by the patient, aided if necessary by pressure on the pit of the stomach. To favor the passage of the stomach-tube, it is dipped in warm water, held between thumb and forefinger like a pen, and passed in the middle line of the mouth. As it reaches the fauces the patient is directed to swallow, and as he does so the tube is rapidly pushed on into the stomach. The desire to gag is overcome if the patient takes deep breaths during the swallowing and after the tube is in the stomach. The saliva is prevented from running into the receptacle by wrapping a towel around the tube.

The liquid evacuated contains a sediment of more or less digested bread. If fermentation is going on in the stomach, there is a layer of foam on the surface, and the odor is that of butyric and other fatty acids. The amount of mucus present may be estimated by lifting it upon a loop of wire. Five cc. of the filtered contents are placed in a porcelain dish with a drop or two of one-half-of-one-per-cent. alcoholic solution of di-

methyl-amido-azo-benzol. If this becomes pink it indicates the presence of free hydrochloric acid, and this is estimated by adding decinormal sodium hydroxide solution from a Mohr's burette (50 cc.), drop by drop, until the yellow color of the azo-benzol is restored. This occurs when the free hydrochloric acid is neutralized. The number of cc. of sodium hydroxide used indicates the amount of hydrochloric acid present. To the same 5 cc. are added a few drops of one-per-cent. solution of Congo red, and this, if any further free acid is present, turns violet. Such free acid is organic and is estimated by adding the hydroxide until the red color returns. Lastly, a few drops of one-per-cent. alcoholic solution of phenolphtalein are added and the sodium hydroxide continued until the resulting pink color becomes no deeper on the addition of a single drop of the decinormal solution. This represents the combined acid or acid albumin, and the acid salts. As 5 cc. of stomach-contents have been employed, the number of cc. of sodium hydroxide used in each case must be multiplied by 20 to represent the ingredients in 100 cc. If only 2 cc. of contents are used the figures must be multiplied by 50. The sum of the results represents the total acidity.

Normally the return from the test-meal should be 60 to 100 cc., with acidity 50 to 60, free hydrochloric acid 10 to 15, combined acid 40 to 50, no organic acid and only slight mucus. The lactic acid-forming bacilli do not grow in the presence of free hydrochloric acid, so if this is found, lactic acid is not tested for; but if hydrochloric acid is absent and the Congo-red reaction is positive, the lactic acid test must be made as follows: One drop of tincture of iron is mixed with enough water to leave a barely perceptible color, and the liquid divided between two test-tubes. One tube is retained for comparison, and to the other a few drops of filtered contents are added; a yellow color indicates lactic acid. An ether extract of the contents will give the test more clearly and with greater sureness.

If blood is suspected mix 5 cc. of filtered contents with 3 cc. of glacial acetic acid, and add 5 cc. of ether. Shake well, set aside until the ether rises, and pour it off; to this ether add a few drops of tincture of guaiac and then a like amount of peroxide of hydrogen. A dark-blue color indicates blood.

The deviations from normal acidity are due to increase, decrease, or absence of free and combined hydrochloric acid, to great variability in the amount of acidity and to the presence of organic acids. Change in the amount of hydrochloric acid accompanies changed glandular activity, and this may be functional or organic. Persistent increase of mucus points to the latter. Increased acidity is found in hyperchlorhydria, hyperchylia, the hypersthenic type of chronic gastritis, and usually in ulcer. Decrease of acid occurs in functional loss of glandular activity, and in the asthenic form of chronic gastritis. Much diminished total acidity with absence of free hydrochloric acid points to an atrophic condition; and this, if lactic acid is present, favors carcinoma. Marked variations in the acidity in successive examinations suggest gastric neurasthenia, a condition in which the stomach symptoms usually depend on the ingestion of food, but not on the kind of food. In general neurasthenia a persistently asthenic stomach may be expected. Organic acids other than lactic indicate fermentation and are easily recognized by their characteristic sour smell.

An excessive amount of stomach-contents at the end of the hour means either excessive secretion, pyloric or duodenal obstruction, or muscular asthenia. Much fermentation opposes simple hypersecretion, a normal percentage composition favors it. Active visible peristalsis opposes muscular asthenia and favors obstruction; similar evidence is obtained from the absence of splashing two hours after the ingestion of a pint of water on an empty stomach.

The test-meal is, of course, but one factor in the diagnosis, yet at times it may be the only means of determining the intragastric condition and, besides its function in diagnosis, it also gives direct information as to the kind of treatment necessary. Excessive acidity demands food which is non-stimulating or has much affinity for the acid. Appropriate foods would be milk, if well borne, cornmeal, wheat, flaked rice, eggs, game, white meats, and lean fish. A limited amount of starchy food may be allowed, and plenty of water to dilute the very acid gastric juice. Spices should be avoided. Of drugs, 1/25 grain of extract of belladonna twenty minutes before meals tends to lessen stomach secretion without systemic effects. An antacid may be given two hours after meals. If the bowels are loose this may be chalk mixture; if constipation exists, rhubarb and magnesia without ginger. For diminished acidity the dietary may include milk, oysters, sweetbreads, mutton, red meats, soft-boiled eggs, oatmeal, green vegetables, mashed baked potatoes, and toast or stale bread. Each meal may be preceded by a bitter or stimulant, such as infusion of quassia or condurango, or the compound tinctures of gentian, cinchona, and cardamon. In cases of much diminished acidity, it may be necessary, in order to protect the intestines, to aid digestion with a grain or two of pepsin and ten minims of dilute hydrochloric acid, given once or twice during the digestive period. If there is much mucus, early morning lavage may be of benefit; if fermentation is present, lavage at night will often permit comfortable sleep. Atrophic conditions throw the burden of digestion entirely upon the intestines, therefore the food must be such as to be easily evacuated by the stomach and readily digested in the intestines. It may include milk, soups, broths, well-cooked cereals, baked apples, mashed and strained vegetables, and finely-divided light meats. Massage over the stomach, or alternate hot and cold water, and the internal administration of strychnine stimulate the motor

activity and favor the passage of the food into the intestines. Fruits that cause the formation of much gas, or induce looseness of the bowels, should be prohibited.

A suspected ulcer contraindicates the use of the stomach-tube, and in such a case the vomitus may give valuable information. If the stomach-contents are protected from evaporation, the examination may be deferred until convenient, for the gastric juice is antiseptic, and but little digestive change takes place outside the body.

Thus, as has been shown, the general practitioner, with the present simple methods at his disposal, need no longer feel that an amateur attempt to examine stomach-contents is impracticable or valueless.

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## THE HYDRIATRIC TREATMENT OF TUBERCULOSIS.[1]

By J. H. KELLOGG, M.D.,
OF BATTLE CREEK, MICH.

SINCE the empiric, Priessnitz of Graefenberg, created a world-wide interest in the curative properties of thermic applications by means of water by restoring to health multitudes of chronic invalids whose cases had been considered incurable, it has been known that hydrotherapy possesses marvelous restorative power in pulmonary tuberculosis. Winternitz of Vienna has published most favorable statistics, and Aberg, in an admirable and interesting paper published in 1890, gave an account of a large number of cases successfully treated by hydriatric means which had stubbornly resisted other measures. Numerous other writers have presented papers on the same subject, especially during these last few years, among which the writer desires to call special attention to the paper of his colleague, Dr. W. H. Riley, of the Colorado Sanitarium, Boulder, Colo.

I have made extensive use of hydriatric methods in the treatment of pulmonary tuberculosis during the last twenty-five years, and will endeavor to present in this paper a brief account of the methods which I found especially helpful as curative agents and as palliatives of the various distressing symptoms complicating morbid conditions, which attend this malady in its several stages.

That the natural curative powers of the body are capable of successfully combating tuberculous disease is shown by the fact that the reports of pathological laboratories in this country as well as in Europe show tuberculous lesions in one-half of all the cases examined post-mortem.

The fact that, although nearly all human beings are almost constantly exposed to infection by the bacillus tuberculosis, all do not contract the disease clearly indicates that the bacillus alone is not sufficient to give rise to pulmonary tuberculosis. The soil in which the tubercle germ flourishes best is found in the tissues of a deteriorated organism. And it is without doubt by the lowering of the vital status of the individual, the lessening of his resistance to pathogenic agents, which from a therapeutic standpoint must be regarded as the real foundation of this formidable malady. This statement is based upon two potent facts: (1) It is impossible directly to destroy the tubercle bacilli when they have once obtained a foothold in the lungs without the employment of such measures as will destroy the living tissues as well as the parasitic microbes. For this reason all the methods of treating pulmonary tuberculosis which have been addressed exclusively to the destruction of the bacillus have proved unsuccessful. (2) Even if the bacillus could be destroyed by germicides or by other means, a return of the disease must be expected, for it is practically impossible to escape exposure to infection, and when infection of an organism has once occurred, the fact is evidence that the individual is susceptible to the disease; that is, his vital resistance has been lowered to such a degree, and the defenses of his body so deteriorated, that he is no longer able to resist the invasion of these pathogenic agents.

I hold that the most important thing to be done in dealing with any case of tuberculosis, aside from meeting such indications as are necessary to contribute to the patient's comfort, or to arrest some process likely to prove immediately fatal, is to build up the person's vital resistance, to improve the quality of his tissues, to raise his whole vital status, and to recover, as far as possible, his original ability to resist the invasion of parasitic organisms and to destroy them when they have gained entrance to the body. The healing power of all disease is in the body itself. Disease of whatever character or origin—acute, chronic, idiopathic, traumatic, or infectious—if recovered from, must be conquered by the body itself. The healing power is in the tissues within the body. The blood is the great healing agent. Improved quality and quantity of blood and increased movement of blood through diseased parts are the things most essential to be accomplished in dealing with a chronic malady of any sort. Hydriatric applications afford the most powerful of all means of awakening and increasing vital resistance in the body, accelerating tissue change, blood-making, and all the vital activities of the body which are essential to life and which participate in the defensive and curative processes.

In the eager search for new remedies and methods by which to combat this most formidable of human maladies, it is indeed singular that a method so well tested and proved as hydrotherapy should be almost universally overlooked. All sorts of measures for influencing the pulmonary mucous membrane have been devised, exploited and tested by practical experience and generally found wanting. Moist air, dry air, cold air, superheated air, air medicated with almost every known volatile agent, from the aromatic extract of pine leaves to malodorous sul-

[1] Read before the American Climatological Association, Washington, D. C.

phuret of hydrogen, have been applied to the mucous membrane of the lungs by inhalation, while the important fact that the pulmonary circulation and the respiratory functions not only in the lungs but in the tissues can be far more certainly and powerfully influenced by thermic applications to that wonderful organ, the skin, has been overlooked.

It is pretty well admitted on all sides that the open-air treatment of consumption with proper diet, carefully graduated exercise, especially contact of the body under proper conditions with cold air, constitutes a better means of combating pulmonary tuberculosis than any system of medication. Exercise and cold air are chiefly helpful by their influence upon metabolism and movement of blood. Exercise influences especially the heart and respiratory movements, while cold air acts chiefly through the thermic impressions and the vasomotor changes and metabolic activities resulting therefrom. Patients who are able to exercise freely in the open air, if other conditions are favorable, generally improve, but the elevation of temperature and the tendency to emaciation so commonly present in this disease often interdict exercise and not infrequently require absolute rest. While rest favors the accumulation of residual tissue, it has the great disadvantage that it lessens excretion, diminishes respiratory movement, lessens the general movement of blood in the body, and lowers vital resistance. It is preferable to exercise only because exercise tends to produce elevation of temperature, even in normal conditions, and when the heat-regulating functions of the body are disturbed, as is already the case in a febrile state, even very gentle exercise may produce a very great elevation of the temperature curve. Elevation of temperature likewise gives rise to excessive oxidation of nitrogen, which is still further aggravated by exercise, thus causing muscular wasting and resulting weakness with lessened nervous and glandular activity.

The curative effects of cold applications to the skin are based upon the same principle, and act as do those of exercise and cold air. A cold application at first excites cardiac activity, the heart later being slowed by the increase of arterial tension which quickly follows a cold application. The peripheral heart, the small vessels of the skin and muscles especially are excited to increased activity, opening more widely, while at the same time their rhythmical activity is accelerated.

Thus, the general movement of blood throughout the body is accelerated while arterial tension is elevated. The irritation of cold when brought in contact with the skin raises the nerve tone as well as vascular tone, stimulating all forms of vital activity. It is in this way that the appetite is stimulated by exercise in cold air, by seabathing, by cold impressions made in any way. Pavlow, in his beautiful experiments for the purpose of determining the conditions which influence the secretion of the gastric fluids, showed very clearly the intimate connection between the appetite and the gastric secretion. He observed that the stronger the appetite the greater the amount of secretion. The absence of appetite, especially in febrile conditions, is a clear evidence of a lack of digestive power. There is abundant experimental evidence to support the power of cold cutaneous applications to stimulate the production of hydrochloric acid and gastric ferments. Cold applications to the skin likewise stimulate respiratory activity. A dash of cold water upon any portion of the body, especially upon the chest, produces very deep involuntary inspiration by exciting the respiratory centers. After a general cold application or the application of a cold chest compress, there is a marked increase in the depth of the respiratory movements for a considerable length of time. The amount of tidal air may be increased, as shown by my own experiments with the cold towel-rub, immediately after the application 33 per cent., forty minutes after 10 per cent.; wet sheet-rub immediately after 36 per cent., thirty minutes after 12 per cent, and an hour after 8 per cent.; the chest-pack, immediately after 33 per cent., thirty minutes after 18 per cent., and an hour after 4 per cent.; and cold mitten-friction immediately after 39 per cent. and thirty minutes after 8 per cent., on the respiratory volume. The respiratory quotient is also increased, showing the enormous increase in the absorption of oxygen by the blood and the oxygenation of the tissues.

Hydrotherapy is thus not only a powerful ally of the open-air treatment of pulmonary tuberculosis, acting as an adjunct of exercise, sunlight, cold or cool air, proper diet, and other hygienic conditions and physiological measures, but it is actually indispensable in a large number of cases in which the patient is so feeble, either from loss of blood or reduction of strength by some other cause that the advantages of the open-air method are only in small part available. In these cases hydriatric measures properly adapted to individual cases serve as a substitute for cold air and exercise and have the advantage over both these measures in the fact that they are capable of absolute regulation and graduation, awakening within the system the same reactions more or less ample and intense as may be desired and thus serving as a means by which the patient may be lifted from a state of utter helplessness by daily increments of energy until he becomes capable of utilizing with advantage more vigorous measures.

Hydrotherapy is of special value during the hot months of the summer season, which are exceedingly trying to the tuberculous patient, as a means of antagonizing the debilitating effects of heat. Observations with Mosso's ergograph show that extreme muscular and nervous exhaustion resulting from the hot bath may be instantly removed by a cold application. Not only is the depressing effect of the hot bath wholly antidoted by the succeeding cold application, but the output of energy may be raised even above

the normal level. During the winter months when out-of-door exercise is in many localities not infrequently prohibited for weeks at a time by inclement weather, except in cases of those who have been systematically trained to endure contact of the cold bath, hydrotherapy is invaluable as a substitute for the tonic influence of cold air and exercise.

Hydrotherapy affords the most valuable of all known means of training the skin. General cold applications may be properly termed "vasomotor gymnastics," in which not only the skin but the vasomotor centers controlling the cutaneous circulation are brought into vigorous exercise. By the daily repetition of the cold bath systematically graduated from higher to lower temperatures,

COLD MITTEN FRICTION.
Fig. 1.

the ability of the skin to react quickly to thermic impressions may be enormously increased. A healthy well-trained skin contracts vigorously when a cold impression is made upon it. Not only the blood-vessels, small arteries and veins, but also the lymphatics, even the capillaries, and all the muscular structures of the skin contract, thus lessening the blood-supply and preventing the undue cooling of the blood which gives rise to chill and taking cold. In no class of cases is this training of the skin and the protection which it affords more necessary than in cases of pulmonary tuberculosis. The cold bath affords the only means by which this training can be accomplished, and hence it is indispensable to the rational treatment of this malady.

Cold water is a physiological tonic and has the advantage over medicinal tonics of all sorts in that it awakens nervous activity without the imposition of any extra burdens upon any vital organs and without hampering the activity of any function. The cold bath employed in such a manner as to produce tonic effects accomplishes its results by increasing vital resistance to the causes of pathological processes by making the wheels of life run more smoothly, by lifting the whole vital economy to a higher level. The impression made upon that harp of a million strings —the skin, with its vast network of sensory, motor, sympathetic, vasomotor and thermic nerves, arouses every nerve-center, every sympathetic ganglion, every sensory and motor filament in the entire body to heightened life and activity. Every blood-vessel throbs with quickened impulses, the whole being is translated into a new state of existence.

A person who has never experienced the glow of exhilaration, the invigoration and buoyancy of body and mind which accompany the state of reaction from a short, general cold application, cannot well appreciate the value or significance of the cold bath as a physiological stimulant. It is not too much to say that it is of all measures known to man the most valuable as a means of arousing to activity the flagging energies of the body and of lifting the enervated invalid out of the organic and functional disorders of chronic diseases.

The tonic effects of cold water are unquestionably, to a large degree, due to the influence of cold impressions acting through the nerves of the skin upon the sympathetic nerve-centers. The awakening of the sympathetic to renewed activity, or a balancing of its action, is what is especially needed by the great majority of chronic invalids. The functions of the brain and spinal cord, and through them all forms of nervous activity are, to a considerable extent, influenced by the sympathetic. The sensation of well-being which accompanies the reaction following a general cold application is largely due to the increased activity of the cerebral circulation brought about through the stimulation of the sympathetic. By its power to influence the sympathetic, hydrotherapy is capable of controlling, reorganizing, balancing, all the processes of organic life, and through them, modifying the functions of animal life to a marvelous degree.

The methods by which the powerful restorative effects of water may be obtained are exceedingly simple. They do not require elaborate apparatus or hospital appliances, although they do require the use of judgment and discretion in their application.

The general method pursued by Aberg consists in the application of cold water, the intensity of the application being systematically increased. Aberg divides his hydriatric applications into three grades, which may be briefly described as follows: (1) Bathing of the face, neck, and the anterior and posterior surfaces of

the chest with a sponge dipped in cold water and wrung dry. The application is at first very short, and is immediately followed with drying and friction of the parts. The patient remains

WET SHEET RUB. (First Step.)

Fig. 2.

covered in bed or exercises in the open air until reaction is complete. The application is first made but once a day—in the morning. Later both morning and evening, the sponge wrung a little less dry each day. (2) Cold water is poured over the head, neck, face, back and breast of the patient from a watering-pot, each part being gone over one or more times as the treatment progresses. The parts are then dried and rubbed as before, and reaction promoted by rest in bed or exercise. (3) Immersion of the whole body in the full cold bath, followed by immediate drying with vigorous rubbing. The bath is of very short duration (2 to 6 seconds).

Ice-water is used for the sponging and sprinkling with a watering-pot. Water at a temperature of 45 to 54° F. is used for the full bath. Aberg claimed for his method the suppression of the night-sweats and fever within a few days after the beginning of treatment in most cases, and a notable increase in appetite and body-weight, often very rapid and marked, and improvement in all respects.

The method of Winternitz is somewhat less heroic than that of Aberg. He employs ablution in place of sponging and wet sheet-rubbings (45 to 48° F.) in place of the sprinklings; and the cold rain-douche or plunge-bath at 54 to 58° F. Winternitz employs also the chest-pack, of which Aberg seems to make no use.

The method which I have formulated and from which I have seen excellent results differs somewhat in detail, although not in principle from that pursued by Aberg and Winternitz. Four different sets of procedures are employed for producing general effects, each of which is capable of being graduated to any degree desired. These are as follows:

1. Dry friction of the whole surface with the naked hand or with the hand protected with a friction-mitt. The friction should be continued until the surface is warm and vigorous cutaneous circulation well established. The dry friction is followed by friction with the hands dipped in water at 60° F. The temperature of the water is lowered one or two degrees each day until ice-water is used, and the number of dippings of the hand in the water is each day increased. The parts are carefully rubbed, then dried, and rubbed with the hand until warm and red. This application should be made twice a day, in the morning before the patient rises and at night after retiring.

2. Cold, wet friction with the friction-mitt (Fig 1) dipped in water, extending over the whole surface of the body to be applied first,

WET SHEET RUB. (Second Step.)

Fig. 3.

once daily, preferably in the morning, later, twice a day, in the evening as well as in the morning, application being substituted for the wet hand-rubbing. The application should be made

to small areas of the skin in succession, each part being rubbed until red, then well dried, and rubbed with the hand before extending to another area. The patient should not be allowed to become chilly. The temperature of the water should be at first 60° F. and then should be gradually lowered from day to day until ice-water is employed. The rate at which the temperature is lowered may vary from one to two degrees daily to three or four degrees, according to the susceptibility of the patient. The patient, if feeble, should remain in bed until good reaction has occurred. If strong enough to do so, the patient should walk after treatment for fifteen to twenty minutes, or exercise moderately for an equal length of time in a gymnasium to promote reaction. If the reaction is not complete, pul-

WET SHEET RUB. (Third Step.)

Fig. 4.

monary congestion, cough, and other ill-effects will be apparent. The feet and hands, as well as the general surface of the body, should show good reaction, as indicated by warmth and natural color. Coldness of the hands and feet after the operation indicates defective reaction and requires heating processes of some sort, as short fomentation to the spine, or warming of the hands and feet by means of rubber-bags filled with hot water, or immersion in hot water for a few minutes before the application and more thorough rubbing in connection with the cold application (Fig. 2).

3. The wet rubbing-sheet at 60° F., the temperature being gradually lowered to 50° F. This application is best made in the morning when the patient rises warm from the bed. It should be taken in a warm room. After the application, if the patient is feeble, he should return to bed and remain there until thoroughly warmed, but, if strong, he may exercise moderately for fifteen to twenty minutes to promote reaction. The duration of the application should be one to three minutes. If the patient's temperature is subnormal in the morning, the application should be made later, as at 10 or 11 A. M. It is well in such cases also to precede the cold application by heating the skin by the sun-bath, the electric-light bath, or the skin may be warmed by dry friction.

In the absence of other measures an improvised vapor-bath may be employed for two to three minutes, or the patient may be subjected to the action of a warm rain-douche, a hot full bath (104° F. for three to five minutes), a hot foot-bath, or a fomentation to the spine or abdomen. Great care must be taken to avoid sweating and overheating. The heating process should not last more than three to five minutes. If reaction is deficient, the patient may, for the first applications, stand in a hot foot-bath of 104° F. during the application of the cold sheet. To prevent congestion of the lungs under a general cold application, the chest should be rubbed with the dry hand or the friction-mitt until red before the application is made. The attendant applies the hand, after dipping the hand in ice-water, to the chest before and behind a few times with vigorous rubbing. The duration of the wet sheet-rubbing should not be more than thirty or forty seconds at first. The time may be gradually extended to two minutes. Two persons should be employed in administering the treatment, one to rub the legs, while the other is rubbing the arms and trunk. Great care should be taken to avoid chilling by evaporation, either before or after the rubbing. To prevent this the patient should be wrapped in a woolen blanket until everything is in readiness for the application of the wet sheet. Then as the woolen blanket is withdrawn the wet sheet is applied as shown in Figs. 2, 3, and 4, and the procedures already described carried out with vigor and with discrimination.

4. The fourth procedure begins with the warm rain-douche, temperature 100° F., for one minute, while a hot spray, 110-120° F., is applied to the legs for the same length of time. The application terminates with the cold rain-douche, 60° F., for ten seconds. The duration of the application should be gradually increased to 30 seconds. Immediately after the application the patient should be wrapped in a Turkish sheet and thoroughly rubbed by two attendants until reaction is well established. Complete reaction should be secured by wrapping in blankets for a few minutes, or by moderate exercise.

[To be continued.]

## BRONCHIAL DISEASE NOT INVARIABLY A CONTRAINDICATION FOR ETHER ANESTHESIA IN ABDOMINAL SURGERY.[1]

BY THADDEUS A. REAMY, M.D.,
OF CINCINNATI, OHIO.

MY personal experience in surgical anesthesia embraces some 8000 cases, representing minor and major operations done by me in private houses, private and public hospitals. Ninety-four per cent. of the patients were women. My obstetrical work comprises more than 3000 deliveries, 2000 of these under chloroform anesthesia. As a rule, it was not employed until the second stage of labor. This reference to obstetrical work is incidental, since it is, of course, not included in the 8000 cases. It may, however, show that I have not presumed to speak without the authority of some experience upon the general subject.

So convinced am I of the greater safety of ether than of chloroform as an anesthetic in surgical work that in later years I uniformly selected it except in the presence of strongly marked contraindications—serious disease of the kidneys or of the respiratory organs. I have never lost a patient under ether or chloroform, although I have on several occasions witnessed very unsatisfactory symptoms.

In this brief clinical note I shall not discuss the general question of anesthesia. What I say applies to ether alone. Preparation of the patient and methods of administration must be briefly considered, because these matters are, in my opinion, vital to the desired results. Except in emergency cases I order free cleaning out of the bowels for a woman upon whom I am to make either abdominal or vaginal section. This is done by a saline purgative the day before the section, after which she must take no solid food. She is given coffee and cream three hours before the section, and four grains of calomel an hour before. Unless there are contraindications she is given morphine, gr. 1/6, and atropine, gr. 1/20, twenty minutes before the commencement of the anesthesia.

The ether is administered in the operating-room, with the patient on the operating-table. The temperature of the room should be 98° to 100° F. In all cases of weak heart, or where there is bronchial trouble, the table should be in the modified Trendelenburg position—*i. e.*, the chest of the patient should be six to eight inches lower than the pelvis and lower extremities. A hard pillow, some three or four inches thick, should incline the head forward, so as to facilitate free respiration, and to some extent guard against the falling back of the tongue during anesthesia. This position also favors the escape of mucus and broken epithelium, which may be very abundant, especially in patients suffering from bronchitis, when anesthesia has continued for some time. Nothing which has been said as to position relates to the surgical aspects of the case. If the full Trendelenburg position is desired, very well. Even in that position it is better if the head is carried slightly forward for reasons already named.

*Quality of Ether.* This is of prime importance in all cases. It is, if possible, still more important when the patient has bronchial or kidney disease. Impure ether is responsible for much of the danger attending anesthesia, for the undue irritation of the respiratory passages and for the nausea that follows an operation. For years I have avoided all anxiety as to quality of the ether used by ordering Squibb's anesthetic ether in one-quarter and one-half pound cans; pouring it direct from the cans into the inhaler, thus guaranteeing its purity and freshness. There may be other manufacturers equally successful, but as Squibb's ether has never disappointed me I have not changed.

*Method of Administration.*—This I consider important both as to immediate safety and subsequent results. It is certainly of great moment in patients with bronchitis. I greatly prefer the closed inhaler, if it is so constructed as to secure the ends in view without compromising disadvantages. Such an inhaler I here present. It is constructed simply of several thicknesses of paper, such as newspapers are printed on, cut and stitched together. It is so shaped that when placed over the face it includes the chin and nose. Two sizes are made, to fit large or small faces. It is covered by a slip or case made of thick muslin. This fits accurately. The free end of the slip must be long enough to reach, when applied, below the absorbent cotton, which is packed closely in the inhaler and upon which ether is poured to saturation at the commencement of the session. As a rule, no more ether is added unless the operation continues longer than forty minutes. The inhaler is made by my nurses and requires but a few minutes to construct. It is cheap and simple. In no case is the absorbent cotton used the second time, and in no instance is the case of muslin to be used again until it has been washed and sterilized by the same treatment as that given my gauze sponges. The paper cup may be used repeatedly, only requiring to be sterilized by hot air. During the inhalation the anesthetizer places the hood closely to the face, holding it in position by compressing the two sides firmly against the bridge of the nose with the index finger and thumb of one hand, while with the fingers of the other hand the opposite wall of the inhaler is pressed against the chin. Thus the inhaler fits rather snugly at every point.

A very small quantity of atmospheric air will, however, pass continually through the texture of the inhaler, and a small quantity will pass in about the bridge of the nose. The quantity of air can readily be increased at this point without removing the inhaler, should evidence of cyanosis demand it. It should have been noted that there is a considerable space in the inhaler, when applied, between the nose and mouth of the pa-

[1] Read before the American Gynecological Society, Washington, D.C., May 2, 1900.

tient and the cotton containing the ether. This is a reservoir for the ether vapor and the carbon dioxide, which in a warm state is being inspired. This mixture is, of course, mechanical, not chemical. The relative proportions of the agents are constantly modified by the conditions of the patient, the profoundness and the duration of the anesthesia.

I consider this mixture desirable for reinhalation from a moderately close inhaler. First, because it is far less irritating to the respiratory mucous membrane either in the pharynx, larynx, trachea, larger or smaller bronchi; second, such a mixture has the dual action of stimulating the capillary circulation in these membranes, so as to modify the character of congestion present in acute, subacute, and chronic bronchitis when present, followed by rapid relief in crisis by expectoration, and the sedative action sought by the use of other remedies in such cases, but too often sought in vain; third, the quantity of ether necessary to secure anesthesia for a given length of time is greatly diminished. This avoids an element of positive immediate danger, that of overcharging the system with ether, thus endangering the respiratory and cardiac centers. It also guards against possible damage to the kidneys, relieving them from the necessity of the removal of an excessive amount of ether subsequent to the operation. The same may be said of the lungs, through which also a good proportion of the ether which has been absorbed must be removed. My clinical observations justify me in saying that in properly selected cases ether anesthesia, instead of aggravating bronchial disease when it exists, or of exciting it in cases when it does not exist, becomes, when properly managed, a most valuable curative agent.

Within the past five years I have had evidence that bronchial disease was seriously aggravated by ether in but a single patient. But I must be more specific as to the method of administering. It is important that the patient is tranquil, not excited by fear. She will have confidence in no one so much as the surgeon who is to operate. It is my custom in private and in private hospital practice to administer the ether myself until unconsciousness is secured. If proper asepsis has been observed my hands can be sufficiently cleaned again in a minute so that I may proceed with the operation. Before the inhalation is commenced I seat myself near the patient and speak to her words of kindness and of assurance, asking that when she commences the inhalation she will breathe naturally. It is wrong to ask the patient to breathe deeply. Shallow breathing at the start will go far to avoid the reflex coughing excited by irritation at the tracheal bifurcation. The inhaler is held two or three inches from the face until five or six inspirations are made; it is then placed closely over the face and continued until reflex coughing occurs. Usually this will not take place until after a number of inspirations, in some cases not at all. When coughing and resistance occur the inhaler must be removed far away so that unmixed air can be breathed. When quiet is restored the inhaler is reapplied, and the patient, who is of course yet fully conscious, is requested to avoid resistance. After four to six inspirations with the inhaler near the face it is now placed closely down when usually no further coughing or resistance will occur.

In the last series of 100 consecutive cases anesthetized in my private hospital prior to my sale of the hospital, of which accurate records were kept, the average time required for complete anesthesia was six minutes—in many cases it was accomplished in four minutes. Struggling was rare, indeed, and not in any patient did damage of the lung or kidney follow. It has already been stated that if the cotton in the inhaler is saturated at the commencement full anesthesia will be sustained usually for forty minutes without adding more ether. Of course, the inhaler must be constantly applied, as it should be, unless some symptom should demand that the patient have fresh air. If the operation requires more time more ether must be added; but when added caution must be observed lest the patient, whose system is already well charged, receives an overquantity. Thus, notwithstanding the cotton is again filled to saturation, the inhaler must not be held too closely over the face until the effects are observed. The frequent additions of small quantities of ether to the inhaler, awaiting resistance of the patient as a signal for more, is mentioned only to be condemned. It is not the quantity of ether placed in the cotton which is to be considered but the quantity that enters the circulation. Of course, the administration of ether from a close inhaler, so that the patient reinhales the vapor mixed with carbon dioxide, is neither new nor novel. It is advocated by many and condemned by more. But as far as I know, excepting the fact of the lessened amount of ether required, and the extension of the practice to include cases of bronchial disease, the reasons for such practice have not been advocated as the clinical facts warrant, nor have the details of conditions essential to the best results been urged with sufficient emphasis.

I am also aware that Clover's inhaler and others are constructed for reinhalation. These I have used frequently, but my objection to such inhalers is that the admixture of the ether and the carbon dioxide does not commence at the commencement of the session and is not automatically continued—also that the quantity of atmospheric air admitted, if any, is not regulated. Again, such an apparatus requires more skill and judgment on the part of the anesthetist. Finally, the inhaler is cumbrous to carry about and difficult to keep clean. The inhaler which I show you is too simple to be called an inhaler. It is simply a modification of the old paper cone and sponge, but it has essential differences in principle.

In my private work the anesthetic is, as a rule, administered by one of my nurses with my as-

sistance and under my supervision as already noted. I am aware that this course is open to criticism. It should be remembered, however, that I do not impose the custom upon others. Finally, notwithstanding the increased blood-pressure in the earlier stages of ether anesthesia, and notwithstanding the high temperature of the air in the operating-room, at the close of the operation, especially if it has been prolonged, the body temperature of the patient is now reduced one-half to one degree; the capillaries are relaxed, and she is bathed in perspiration. It is therefore plain that the greatest caution must be taken in removing her from the operating-room to her own room. I have often seen patients, with insufficient clothing, wheeled through cold corridors after operation. Thus often is occasioned the bronchitis, pneumonia, or kidney disease falsely attributed to ether.

The following cases, briefly abstracted from my private hospital records, may illustrate the subject.

*Case I.*—Miss F. C., aged twenty-eight years, entered my private hospital January 9, 1895. Had been under my observation and care for a year. Had suffered from unbearable dysmenorrhea, and had had two attacks of pelvic peritonitis; was now having occasional attacks of hystero-epilepsy. She and her friends were anxious to have the ovaries removed. During the past six months she had suffered from bronchial cough. For the last six weeks the expectoration was characteristic and copious. Patient had lost twenty pounds in weight. After proper action abdominal section was made and the ovaries removed January 28, 1895, assisted by Drs. C. L. Bonfield and Edward Mitchel. Left ovary enlarged and cystic; the right hard, half-size; extensive adhesions. Ether was administered with the patient in the Trendelenburg position. Frothy mucopurulent discharge through the mouth and nose during anesthesia was very abundant, causing much embarrassment and prolonging the time required for securing unconsciousness to nine minutes. The position of the patient, however, facilitated the escape of this secretion. The operation lasted, including closing of the abdominal wound, thirty minutes. Temperature at the commencement of anesthesia, 99.5° F., at the close of the operation 98° F. Recovery was uninterrupted; cough and expectoration continued for ten days, but rapidly diminished after the second day. The patient was allowed terraline and sherry wine for the cough. Temperature was at no time after the operation over 101° F. Within six months the patient had gained twenty pounds; has now gained thirty-four pounds. Health perfect.

*Case II.*—Mrs. F. H., aged thirty years, entered my private hospital February 11, 1898; married nine years, no children; one abortion seven years ago. Had menstruated regularly, but during the past year had noticed at irregular intervals discharge of blood from the vagina; recently it has been more profuse; odor and pain were absent. Patient has lost in weight and is anemic; has distressing cough, which has continued during the past month, but with little or no expectoration. This morning, however, after a journey of 150 miles by rail, expectoration of frothy mucopurulent matter is rather abundant. She has a temperature of 100° F.; pulse 90.

Examination of the chest shows moist râles, with gurgling squeaking, etc. Expiration prolonged. No dulness on percussion. Mucous membrane of fauces and pharynx thickened and redder than normal. Diagnosis: Bronchitis, second stage.

Examination of the pelvic organs shows vaginal portion of the cervix half destroyed by carcinoma; uterus freely movable; no perceptible involvement of glands. Decided upon vaginal hysterectomy, to be done as soon as the bronchial difficulty and general condition would justify operation under the approved general treatment. The patient did not improve; cough was distressing, expectoration now occasionally showing streaks of blood. Vaginal disinfectants and astringents per vaginam kept up. Loss of blood from the uterus increasing. Decided not to wait longer. Removed the uterus by vaginal section on February 16th. Four clamps; no ligatures. Present and assisting Drs. C. L. Bonfield and William Gillespie. Ether until unconsciousness, administered by myself, then continued by Miss Pullen, the head nurse. Time required for full anesthesia twelve minutes, as the cough and expectoration were very annoying. Much frothy mucus, some of it well colored with blood, was discharged. During administration the patient was in the Trendelenburg position, but head elevated somewhat. Not any vomiting after operation. At the close of the operation the temperature was 99° F.; at the commencement of inhalation it was 100° F. The patient reacted well and made a speedy recovery. The temperature at any time after the operation was not over 101° F. The cough and expectoration yielded as if by magic; she had absolutely no cough after the second day. The bronchial symptoms never returned. A report from this woman one month since shows her in perfect health; she has gained thirty-five pounds in weight.

My record shows a number of cases anesthetized and operated on when bronchitis in the first stage, acute form, was present, with the result of arresting cough and destroying the mucous congestion present; but the length of this paper forbids my giving further details or recital of cases.

Finally, I reiterate the statement that my clinical studies justify me in the belief that in properly selected cases ether inhalation is positively curative of bronchitis. That its action in these cases is largely local I have no question. To avoid unpleasant complications and to secure the desired results, the following points are essential: (1) Proper preparation of the patient. (2) Preparation of the operating-room with a tem-

perature of 98° to 100° F. (3) Pure ether. (4) A proper inhaler. (5) The proper methods of administration. (6) Due caution against exposure in removing the patient from the operating-room to her own room. The temperature of her own room should not be below 80° to 90° F. for several hours after the operation. (7) Proper care of the patient during convalescence. She should be permitted to drink large quantities of water and should keep the bowels freely open.

## CLINICAL MEMORANDUM.

### *PERSISTENT SLOW PULSE.*

BY JAMES J. WALSH, M.D., PH.D.,
OF NEW YORK;
INSTRUCTOR IN DISEASES OF THE CHEST AND GENERAL MEDICINE IN THE NEW YORK POLYCLINIC MEDICAL SCHOOL AND HOSPITAL.

CASES in which the pulse-rate remains persistently below forty are so infrequent as possibly to lend interest to the following case. The patient is a woman, aged thirty-one years, who has enjoyed very good health since childhood, except for an attack of grip about ten years ago when that disease was making its preliminary impression upon the American people and American medicine. The attack was not very severe, but during its course her physician called her attention to the fact that her pulse was very slow. Even during the occurrence of febrile temperatures, it did not reach sixty to the minute. Observations made after the attack of grip showed that her pulse remained persistently at about forty or under.

In the beginning of April of this year she came for treatment for loss of appetite and general indisposition. On examination her pulse was found to be thirty-six. Careful examination of her heart showed that this was also the number of the heart-beats. She has now been under observation for over three months and her pulse-rate has always continued about the same. After a rapid walk of over a half mile to the office it rises to 39 or 40, but it has never exceeded that. She considers herself in good health and is able to do considerable housework. Her duties require her to be on her feet most of the day and her work is rather exhausting. She has to go up and down stairs frequently but does not experience much difficulty. Her respirations are somewhat hurried. She breathes normally 22 to 24 times to the minute. The urine is normal, the arteries show no signs of arteriosclerosis, the liver is not enlarged and the organic functions are not disturbed by her slow pulse. Despite a pulse-rate of 36 she is by no means phlegmatic in temperament, but on the contrary is nervous and high-strung and inclined to be excitable.

Her family and early history do not seem to throw any light on her present condition. Her father is dead. Her mother is living and well and two brothers and two sisters are in good health. The other members of the family do not exhibit this phenomenon of slow pulse, at least as far as can be learned. Her mother often said that the patient was the healthiest of her children, but she had all the diseases of childhood and there was a family tradition to the effect that if a contagious disease existed in their neighborhood she was sure to catch it. She was lively and active as a child and played and jumped rope quite as other children did. Dancing was a favorite amusement later in life and some years ago, when the skirt dance was popular, she frequently danced it for the amusement of friends. After her husband's death and when it became necessary for her to earn her own living, she was on the stage for a time and danced without any embarrassment of the respiratory functions. She frequently danced in drawing-rooms and at private entertainments. It is only during the last two or three years that she has noticed that dancing has proved so exhausting to her that she has had to give it up almost entirely. In general, however, she considers herself as able as any one else for the duties and amusements of life. Under the administration of an ordinary stimulant tonic her digestive symptoms disappeared and her feeling of general good health returned. She complains somewhat of shortness of breath, especially when she ascends rapidly more than one flight of stairs. She has been warned of the danger involved in such overexertion. For this symptom of shortness of breath on exertion atropine, 1/200 of a grain, three times a day, gradually increased until she was taking 1/100 three times a day, had a beneficial effect. The drug had no effect upon the pulse-rate, but it seemed to slow and somewhat deepen the respirations.

The interesting question is whether the present case is one of natural slow pulse, the condition having existed all her life, or whether her pulse-rate of 36 has been acquired. The fact that there is no family history of slow pulse speaks against its congenital origin, although not very strongly. Direct heredity is sometimes an element in the occurrence of slow pulse, but is by no means a necessary implication of its occurrence or non-occurrence. The fact that the patient had all the ordinary diseases of childhood without her attention being called to the presence of a slow pulse seems to show that in her early years the slow pulse did not exist. It has been pointed out in a number of cases that grip may cause a slow pulse that persists for months and sometimes years after recovery. Not many cases are reported in which the slow pulse has persisted as in this patient for over ten years. It now seems probable that her present pulse-rate will continue throughout life.

Just what the lesion may be in a case like this is an interesting subject for speculation. Persistent rapid pulse has been set down by one enthusiastic theorist as due to a discharging or irritative lesion of the nucleus of the accessory fibers of the vagus nerve. In the same way we might say that the condition we have to do with

here is due to an irritative lesion of the inhibitory fibers of the vagus nerve. In either case the carefully-evolved hypothesis does not add anything to our knowledge of slow or rapid pulse and lacks the confirmation of a pathologic basis.

For cases like this the term bradycardia, or as Osler, following Riegel, prefers to call it, brachycardia, is sometimes employed. The name was invented as an analogue of tachycardia. It seems worth while to recall, however, that, as Clifford Allbut says, the status of bradycardia is very different from that of tachycardia. In tachycardia there is an affection that occurs paroxysmally, endures for a certain length of time and then is followed by a return to the normal pulse-rate. For what is known as essential tachycardia there is no well-defined cause and no definite pathologic lesion. The heart gradually or suddenly begins to beat two or three times as fast as before, and then after some hours or days returns to its normal condition. Slow pulse, however, is present as the result of some physiologic or pathologic condition. It endures as long as the cause continues to act and then ceases, usually not to return until the same cause gives occasion for it again, or it endures absolutely throughout life. Physiologically it occurs after childbirth. Pathologically it is seen during convalescence from the infectious diseases, as the result of brain tumors or abscesses or because of reflexes from organs to which are distributed peripheral terminal fibers of the vagus nerve. The most frequent cause of slow pulse is gastro-intestinal disturbance. Functional or organic cancer of various portions of the digestive tract frequently give a pulse below 60.

All of these affections characterized by slow pulse are very different from the condition known as tachycardia. The slow pulse in this patient will probably endure throughout life and there seems no good reason for calling it anything more than persistent slow pulse. A number of cases with a pulse-rate below 50 have been reported in which the condition was congenital. In none of them was there any discernible heart lesion. Some of the individuals were able to bear the strain of a good deal of exertion. One of them was a very successful English athlete. It is to be remarked, however, that this athlete died as the result of a so-called cramp while swimming. Other evidences of lack of resistive vitality are not wanting in similar cases. It is probable that the prognosis of these cases of slow heart is not very favorable. Statistics on the subject, however, are very meager and a more careful reporting of such cases seems desirable.

## MEDICAL PROGRESS.

**Plague Sputum.**—That the sputa of plague patients suffering from primary or secondary pneumonia contain numerous virulent Yersin bacilli is a well-established fact. The persistence of this condition during convalescence has recently been investigated at Oporto by Dr. Métin. Sputa were obtained from eight pneumonic cases at various periods and injected into guinea-pigs. The results of these experiments indicate that the sputa retain their virulence for eight or nine days after the subsidence of the fever and then rapidly become harmless. All the animals inoculated within the first eight days succumbed to uncomplicated plague; those inoculated a day or two later became sick, but recovered; and those that received still later injections manifested slight or no ill effects. In view of these results the doctor considers it safe to regard the sputa as non-contagious ten days after the beginning of apyrexia. Experiments were also made with the blood-serum of patients convalescing from plague, who had not received treatment with antipest serum, for the purpose of explaining the infrequence of reinfection. Guinea-pigs inoculated with the blood-serum and, shortly thereafter, with a virulent culture of plague bacilli all recovered after comparatively mild illness. One pig which received the serum twenty-four hours after the culture died in ten days, the control animal having succumbed in three. Experiments on mice with older serum were less successful, although the animals all lived from one to thirteen days longer than their respective controls.

**Hemorrhagic Grip Epidemic.**—V. Grossule (*Gass. d. osp. e delle clin.*, No. 27, 1900) gives the result of his observations in an epidemic of influenza, affecting seventy per cent. of the inhabitants of a rural district in Italy, where previous to the epidemic, only two or three cases of pneumonia were observed in a population of over two thousand people. During the epidemic nineteen out of thirty-six cases of pneumonia proved fatal; in these cases the hemorrhagic sputum was marked; in a few cases hemoptysis was present. Epistaxis was observed in many cases during the epidemic; some were so profuse as to require nasal plugging. Menorrhagia was a common symptom, even virgins and married women of all ages being affected; some patients previously suffering from amenorrhea sought treatment for the marked menorrhagia which persisted, in one case for seventeen days; in some the uterine hemorrhage was so profuse as to require vaginal tamponading. The frequency of these hemorrhagic manifestations occurring in so many different families and affecting both sexes, independent of age or previous condition, gives strength to the theory that they were caused by the specific poison of influenza.

**Ulcer of the Stomach.**—Despite active research in the last few years, no satisfactory explanation of gastric ulcer can be given, according to H. Weiss (*Centralbl. f. d. ges. Therap.*, Oct., 1900). Virchow's theory is still adhered to by many and it is conceded that in animals even large defects in the mucosa heal kindly unless a hyperacidity exists—the precise condition which

obtains in man. Pathologically a transection of the ulcer shows absence of the mucosa, remains of glands, thickened intima and organizing thrombi in the arteries, round-cell infiltration and thrombosed veins. In some cases aneurismal dilatation with consequent diminution in the nutrition of the coats has been found, other local disturbances in circulation may sometimes be traced to arterial disease, general visceral congestion or to pressure of tumors on the stomach. Less common etiological factors are trauma and infection, the latter acting by the localization of the infectious agent, by small miliary abscesses developing in the mucosa or by a circumscribed generation of toxins. Bacteria, however, disappear with the development of the ulcer. Apart from the fact that the indications for surgical intervention have been more clearly set forth, therapy can record but few advances. Rest and diet are still the important mainstay in medical treatment. The patient must be kept in bed for ten days. The epigastric area should first be cleansed with alcohol and sublimate, a pad with boric ointment and then a very hot flaxseed poultice applied, the latter to be changed every ten to fifteen minutes. At night a Priessnitz pack is used instead. After the tenth day the Priessnitz pack is used alone for three more weeks. In case of hemorrhage, poultices are not to be employed unless a quarter of a year has passed, instead a Priessnitz pack or an ice-bag is admissible. The patients should sip from one-half to one pint of lukewarm Carlsbad water half an hour before breakfast for four weeks. Sodium bicarbonate with or without bismuth is also good. The diet is slowly changed from liquid to soft and then to non-irritating solid food and in severe cases exclusive rectal feeding may at first be demanded. Another good means of medication consists in washing out the stomach and introducing bismuth, made into a thin paste with water, through the sound. In all cases medical treatment should be tried before surgical. The indications for the latter are (1) hemorrhage, especially the small, long-continued bleedings, but also in case of large loss of blood when these show a tendency to recur; (2) severe pain and frequent vomiting; (3) perigastritis or peritonitic abscesses; (4) acute perforation. The dangers of operation are slight. Of the two methods in vogue, pyloroplasty and gastroenterostomy, both are equally good, but the first-named is the simpler.

**On Gonorrheal Arthritis.**—It is not so long ago since gonorrhea was looked upon as a slight affection, leaving no ill-effects in its wake. Now it is understood that endocarditis, myelitis, anterior horn changes, myocarditis, iritis, peritonitis, and, most common of all, arthritis, may follow a simple gonorrheal urethritis and seriously aggravate this distorder. B. Rubinstein (*Berlin. klin. Woch.*, Sept. 10, 1900) speaks of four varieties of the arthritis: (1) Gonorrheal hydrops; (2) serofibrinous inflammation; (3) empyema of the joints, and (4) phlegmonous inflammation. The last-mentioned form in particular may be serious. Tendons, sheaths and bursæ are also vulnerable to the poison and bursitis beneath the Achilles tendon is both common and difficult to heal. Attention is drawn to the value of the Röntgen rays in determining to what extent the joint and the bone are involved. The best treatment consists in the administration of potassium iodide internally and the application of guaiacol or creosote vasogen externally, and, for the more severe forms, irrigation of the joint with bichloride, 1-2000, care being taken not to allow any of the solution to remain in the joint. After the wound has healed, massage is to be instituted. The urethritis is to be treated at the same time, though sometimes, with very energetic measures, a lightening-up of the process is observed.

**Acute Formalin-Poisoning.**—J. Klueber (*Münch. med. Woch.*, Oct. 9, 1900) was recently called to a patient who had by mistake swallowed several ounces of commercial formalin. The man was unconscious, there was marked pallor and cold, clammy perspiration, the respirations were increased, there were râles over the lungs, the temperature, pulse and the various reflexes were normal, and there was neither paralysis nor vomiting. The most prominent feature was the coma, it being impossible to arouse the patient. The next morning the patient awoke several times, but soon fell back into his somnolent condition and anuria set in. At last, toward evening, the coma disappeared, the patient acted as if intoxicated, had some headache, conjunctivitis and the buccal mucosa was reddened. The next morning he was restored to health. Throughout the illness formic acid could be detected in the urine.

**Treatment of Typhoid.**—H. Eichhorst (*Therap. Monatshft.*, Oct., 1900) says he has tried typhoid serum with absolutely negative results, but has been surprised at the remarkably short and favorable course those cases ran which had received antityphoid extract of Tez. Eichhorst believes in absolute rest to the nervous system. Many minor details, such as darkening the room, are of the highest importance. Baths he gives at 95° F. for from fifteen to thirty minutes twice daily until there is no fever for seven days, then once a day. During the febrile period the nutrition should consist of easily-digested food, leaving little feces. Milk answers this purpose admirably and is especially good since also diuretic. It should be boiled and then placed on ice and every half-hour from two to three ounces are to be taken. If the patient objects to milk, it may be masked in coffee, tea or soup. Some variety may prove beneficial; beef-soup with one or two fresh eggs is excellent to break the monotony. All artificial proteid foods are to be discarded as objectionable to the taste in the long end. There is no objection to plenty of

water; it quenches the thirst and flushes out the kidneys. Strict attention is to be paid to cleanliness of the mouth for which purposs aluminium acetate, 1-100, or chlorate of potash, 1-40, is available. The same routine treatment is continued for the first three days that the temperature is normal, on the fourth, fifth and sixth days a farinacious soup, at first thin and later thickened, is allowed. On the seventh day the patient gets from two to three ounces of finely-chopped raw beef and on the tenth day mashed potatoes and roast veal. Bread is permitted with the meat, at first in the form of zwieback soaked in milk. There may be an advantage in giving small doses of salol during convalescence.

**Pharmacology of Jaborandi Alkaloids.**—C. R. Marshall (*Brit. Med. Jour.*, Oct. 13, 1900) accepts Jowett's analysis of jaborandi as containing three alkaloids, pilocarpin, isopilocarpin and pilocarpidin. Isopilocarpin has an action similar to pilocarpin, but is much weaker. Pilocarpidin is practically inactive. In a further note on the action of the liquid extract, they show that this preparation of the British Pharmacopœia is extremely variable, that it should be excluded and that, until preparations properly standardized for the pilocarpin and isopilocarpin are introduced, the drug should not be employed.

**Hemorrhagic Diathesis in Typhoid.**—A. Pinard (*Gazz. d. osp. e delle clin.*, No. 27, 1900) narrates the history of a thirteen-year-old boy, whose family and personal history as to hemophiliac tendency was negative. Three days after convalescence from a mild attack of typhoid fever and directly following the ingestion of a hearty meal the lad was found in a profound state of collapse, with delirium, high temperature, rapid pulse, tympanites, diarrhea and all the symptoms of a relapse of typhoid fever, except that the characteristic eruption was absent; instead, there was an eruption of small discrete red macules not disappearing on pressure, being located on the sternum, extensor surfaces of the arms and inner aspect of the thigh; the eruption soon became hemorrhagic in character, with some confluent patches, the area of which varied from that of a pea to a dime. On the following day there were epistaxes, hemorrhages from the gums, bowel and bladder, all of which were so frequent and so profuse as to leave the patient in a highly anemic condition, with stupor and almost extinct pupil reflexes predominating. Under active administration of ergotine by mouth and subcutaneously in addition to the usual typhoid sponge-baths, the patient began to improve; in two days the hemorrhages had ceased and the boy began to improve, recovering after a lenghty convalescence.

**Gall-Stone Impaction.**—The differential diagnosis between obstruction in the cystic and in the common duct comprises the following features, states F. A. McGrew (*Phila. Med. Jour.*, Oct. 6, 1900): The cystic duct syndrome is gall-stone colic with pain, rigor, vomiting, fever collapse. The pain is excruciating and referred to the right hypochondriac, umbilical or epigastric regions. The common-duct clinical picture varies only in that the pain is referred to the right hypochondriac, right subscapular or right shoulder regions. If the impaction in the cystic duct is permanent we find tenderness in the right hypogastrium to pressure, soreness and dragging pain in the right side, retention cyst (dropsy) of the gall-bladder which forms a slowly-increasing, palpable tumor in the right side of the abdomen. If the lodgment of the stone in the common duct be fixed there will be also tenderness and discomfort in the right hypogastrium, jaundice, bile in the urine, absence of bile in the stools, fatty, clay-colored, offensive stools, constipation, slight distention of the gall-bladder, enlargement of the liver, pulse slowed to 60, 50, even 40, nervous signs of cholemia. On the other hand, if the offending body be only temporarily arrested in the cystic duct, it may slip into the bladder and manifest its presence solely by attacks of slight hypogastric pain and tenderness with colic and some digestive disturbances. If more than one stone be present or the bladder be distended by them, they can be felt as such or grating sounds heard. If the stone slips into the common duct and there stops the syndrome at once becomes that of its site.

**Gall-Stones and Appendicitis.**—A. J. Ochsner (*Phila. Med. Jour.*, Oct. 6, 1900) says that during the past few years he has noted the coincidence between chronic appendicitis and gall-stones and *vice versa*. So much so that in many patients in whom the gall-bladder and passages have been diseased he has found the appendices showing proofs of previous attacks of inflammation. Many of these organs have been thickened, adherent, folded and distorted upon themselves, cicatrized, stenosed or containing fecal calculi, thick mucus or even pus. Since many authorities claim that the greatest single agent in the production of gall-stones is infection and since it has been abundantly established that during appendicular invasions the colon bacillus and other intestinal germs are greatly multiplied throughout the intestinal tract and since access to the gall-bladder may be had directly through the upper bowel and the bile-ducts or indirectly through the circulation of blood or lymph from an inflamed appendix, it appears rational to believe that in the foregoing three factors lies the explanation of the concurrence of these two diseases. Again in support of the infection by indirect avenues is the fact that when the common bile-duct is obstructed or ligated in animals the passages and bladder rapidly grow germs, which may very well reach it through one of the roundabout ways above named. His observations are numerically meager, as they cover only three months early this year, the first period consistently devoted to collecting data. Of eighteen cases of gall-stones six had appendicular lesions,

while of sixty cases of appendicitis (including the six above) 10 per cent. had gall-stones. These last observations are not satisfactory, because in a very great number of the acute appendicites circumstances of local and systemic conditions prevented examination of the gall-bladder. His method of exposing both regions is a long vertical opening of the right rectus sheath.

**Gastric Motility.**—There has been a great advance during the past few years in the perfection of methods for testing the functions of the stomach. A. Macfarlane (*N. Y. Med. Jour.*, Oct. 20 and 27, 1900) says that the numerous neurotic disturbances, so common and so confusing in stomach affections, have very little if any influence on its motor functions. Marked diminution in gastric motility almost always excludes a neurosis, while its presence indicates a serious lesion. The secretory and absorptive powers are not essential to health, as is shown in some cases of achylia gastrica and in total extirpation, but even slight impairment of motility induces marked gastric symptoms, manifested by the dilatation of the stomach and retention of food beyond the normal period. The symptoms are pressure and fulness after eating, rumbling and splashing, nausea, vomiting, epigastric distress or pain, constipation and great thirst. Of these vomiting, especially of food eaten days before, markedly sour and showing three layers, the intense thirst and diminished diuresis are characteristic. To determine the dilatation several methods are used. Inspection may sometimes show peristaltic movements indicating a stenosis and hypertrophied wall. Percussion is frequently helpful. Splashing is important only when obtained several hours after a test-meal. Dilatation by gas forced through a stomach-tube is very efficient. The most reliable sign of motor insufficiency is the presence of food after the normal time. By eating raisins, grapes or berries and swallowing their seeds in the evening and then taking a test-meal in the morning, the motility of stomach may be roughly determined from the presence or absence of the seeds. Or fifteen grains of salol may be given and if it is not detected in the urine until later than seventy-five minutes after ingestion and continues to be present after from thirty to thirty-six hours, then a motor insufficiency is present.

**Persulfate of Soda, or Persodine.**—After discussing the toxicity, the properties, and the results of numerous experiments upon animals with the persulfate of soda, or persodine, G. Milian (*La Presse Méd.*, Oct. 6, 1900) says that the drug, chemically pure in solution, is a substance very slightly toxic and can properly be included among our drugs. Its principle properties are antiseptic, antithermic, aperient and digestive, and an aid to nutrition. Of these properties its aperient and digestive action is most prominent. Secondarily it excites an improvement in nutrition and an increase in weight. Persodine is indicated especially in early tuberculosis, in convalescents from acute illnesses in which the digestive functions are illy reestablished, in chlorotics, in neurasthenics and hypochondriacs who have at the same time gastric atony. The dose of persulfate of soda, or persodine, for an adult is 20 centigrams, or a tablespoonful, in solution in a glass of water. For a child a tea- or dessertspoonful is the dose. It should be taken each twenty-four hours one hour before the principal meal. At the end of three or four weeks the drug should be discontinued to avoid the patient's becoming accustomed to it. Give the drug a little later if the appetite appears to become poor again. Milian says that the only inconvenience from the drug is the appearance, sufficiently rare from other causes, during the first forty-eight hours, of a mild diarrhea which soon disappears. The solution has no disagreeable taste and is easily taken by patients.

**Acute Nephritis Following Influenza.**—One of the more rare complications of influenza is nephritis. R. G. Freeman (*Arch. of Ped.*, Oct., 1900) cites a number of writers on the subject, giving a résumé of such cases of nephritis complicating influenza as have been recorded, and reports a case of his own. His patient was a boy, four years of age, who had had an attack of influenza during each of the three previous winters. The last and fourth attack presented the usual symptoms for a month, when the patient's temperature rose to 102.5° F. and five days later to 105° F. The temperature then went down until, after four days, it was between 100° and 101° F. On this day the patient passed some very red urine, only about two ounces, which contained considerable blood, 5 per cent. by bulk of albumin, and casts, both hyaline and containing blood-cells. About one week before this the urine had a specific gravity of 1022 and contained no albumin and no blood. The day after the red urine was passed the patient's temperature became normal and remained so, but the boy passed urine only in small amounts, varying from six to fourteen ounces a day. The blood continued in the urine for five days and the casts for ten days. At the end of this time there was no albumin or casts in the urine and it was passed in the normal daily amount of about thirty ounces. No edema was present. The child got well and has had no recurrence of the albuminuria during the following year. Two months later, however, after the child had a slight disorder of the bowels with diarrhea, he passed no urine during one night, and the next morning passed about half an ounce which was very red, specific gravity 1050, and contained considerable deposit. There was no albumin, casts or blood, but a considerable quantity of urates and phosphates present. This boy had, therefore, an acute nephritis of the form which most commonly complicates influenza. On this and a few other cases Freeman bases the fol-

lowing conclusions: (1) Although albuminuria is fairly frequent in influenza, nephritis is a rare complication. (2) The nephritis complicating influenza is clinically of the acute hemorrhagic type and morphologically shows toxic lesions. (3) It apparently attacks children more often than adults. (4) The kidney disturbance may appear a few days after the acute symptoms of the influenza, or as long as a month later. (5) The prognosis is good.

**Treatment of Eczema by Red Solar Light.**—The favorable results which Finsen has obtained in variola by the action of the red rays of the solar spectrum have stimulated W. Winternitz (*Sem. méd.*, Aug. 15, 1900) to experiment with an analogous treatment in subjects with eczematous lesions. In these attempts the eruptive regions, previously covered with thin silk stuff of an intense red color, were exposed directly to the solar light as long as possible (even as long as four hours in one case). In all the patients treated in this way, whatever the form of eczema that was present, Winternitz noted a rapid disappearance of the symptoms. The serous oozing, the cutaneous hyperemia and the inflammatory infiltration were diminished, then disappeared completely.

**Treatment of Ulcerous Acne by Applications of Sea-Salt.**—For atrophic or ulcerous acne which attacks most frequently the face and causes the formation of depressed cicatrices, Luithlen (*Sem méd.*, Aug. 15, 1900) has recourse with success to the use of compresses soaked in a one- or two-per-cent. solution of sea-salt applied at night to the affected part. In the daytime these compresses are replaced by a pomade containing from one to two parts of sea-salt to a hundred of lanoline. Under this treatment the ulcers soon became clean, then filled up a little; the infiltrations did not ulcerate again, but retracted rapidly, and no new eruption appeared.

**Bubonic Plague.**—Owing to the presence of several cases of the plague recently appearing in our large sea-coast cities, all physicians should possess sufficient information in regard to the disease to enable them to make a diagnosis and prevent unnecessary infection. The October *Practitioner* has devoted much space to discussions of this disease. J. Cantile says that the period of incubation is from three to five days. It may begin in one of three ways: (1) A sudden rigor followed by high fever, headache, giddiness, vomiting, epigastric pain, and extreme exhaustion; there may be apathy or delirium. (2) Some cases begin with fever, headache, loss of appetite, but with no mental disturbance. (3) In children convulsions frequently usher in the disease. Buboes may be present from the first, but no superficial glandular enlargement may be present at any time. A frequent picture of an early stage of the disease presents an excited, delirious patient, with features drawn and haggard. The eyes are sunken and injected, with a dusky hue around them. The pulse is full and about 100 or more. Respirations are increased, and hiccoughs or a dry cough may be present. A temperature of 101° to 104° F. is usual, but it may be as high as 107°. The tongue is swollen and the dorsum covered by whitish fur. The abdomen is tender and tense and pain is frequently present. Constipation is the rule. When buboes are present the patient may be sitting up with knees near the chin or lying on the side with the leg in a flexed position. The diagnosis is therefore not clear cut, and pneumonia, typhoid or typhus fever or peritonitis may be the diagnosis at the beginning. Pneumonia may be, however, due to the plague bacillus, this forming one of the types of the disease. Later the tongue becomes shriveled and dry and frequently cracks, assuming a mahogany color. Diarrhea with passages of blood may occur. The circulatory and respiratory systems, except in the pneumonic type, furnish no characteristic symptoms. Three-fourths of the patients have buboes, usually appearing in the inguinal, axillary or cervical region. Unilateral adenitis is the rule. The pain attending the adenitis may be excruciating, but as the mental state becomes affected pressure alone will elicit any response. The plague is usually fatal on the fifth or sixth day. The prophylactic method of treatment is summed up in one word, cleanliness. Haffkine's fluid for inoculation is furthermore a prophylactic of tried value. All persons dealing with plague patients should be inoculated. It reduces the chances of infection by 50 per cent. and the mortality by 80 per cent. Prompt symptomatic treatment and careful nursing are all important. Cathartics and medicines to stimulate the heart and circulation, to procure sleep and to allay delirium are indicated. The vigilance of the health officers in isolating cases and demanding disinfection becomes a paramount necessity.

**Food in Zymotic Enteritis.**—Milk food of any description is, in the majority of cases, badly borne during the early part of an attack of summer diarrhea. F. P. Elliott (*Bristol Med. Chir. Jour.*, Sept., 1900) says that it must be completely excluded from the diet at the onset and when vomiting is severe all food must be prohibited for twenty-four hours or more. That food must be given, if at all, only in small and oft-repeated quantities is a *sine qua non* in treating the disease. Boiled water or barley-water should, however, be frequently given. Later broths from mutton, veal and chicken, with the fat removed, form the most satisfactory diet. A return to milk should be made slowly, but as soon as possible. When milk continues to cause trouble raw beef-juice is an excellent substitute. The best way to prepare it is to chop up finely raw rump steak and allow it to soak in four times its bulk of cold water for half an hour. The meat is then squeezed in a piece of muslin and the juice extracted. It should be kept cool and freshly prepared frequently. This may entirely replace the proteid of milk for several days.

# THERAPEUTIC HINTS.

**For Chronic Otorrhea.—**

℞ Pot. iodidi..... 1. (grs. xv)
Tr. iodi .....10. (ʒiiss)
Alcohol abs.....
Glycerin (pure) ..aa. 15 (ʒiv)
Pulv. iodoformi..... 1 (grs. xv)

M. Sig., inject a small quantity of this solution into the auditory canal and down to the tympanum.—*Jour. de Méd. de Paris,* Sept. 30, 1900.

**Amyloform.**—Amyloform, a new successor of iodoform, over which it has the advantage of not possessing any odor, is a powder which has manifest bactericidal properties, retards the secretions, favors the formation of healthy granulations and does not exercise any irritant action either upon the wound or upon the neighboring tissues. Contrary to iodoform, amyloform can be sterilized in dry or moist heat without being decomposed. Because of this property, amyloform gauze affords some assurances of asepsis which are not found in the other antiseptic gauzes. An emulsion for preparing amyloform gauze is:

℞ Amyloform .... 5 to 10. (grs. lxxv to ʒiiss)
Glycerin ..... 10. (ʒiiss)
Alcohol ..... 50. (ʒxiiss)
Ether ..... 40. (ʒx)
Ol. ricini..... o gr. 50 (♏ viiss)

The indications for amyloform are the same as for iodoform.—*La Presse Médicale,* Sept. 15, 1900.

**Cocaine in the Treatment of Intestinal Worms.**—One of the inconveniences attending the use of the anthelmintics ordinarily employed, particularly of extract of male fern, consists of the vomiting following the taking of the medicament. In a case of this kind where the extract of male fern was not well borne by the stomach, Flesch had recourse to the administration, in addition to the male fern, of a solution of cocaine, of which the patient took a few drops from time to time in a little water before and during the ingestion of the capsules of extract of male fern. The solution of cocaine Flesch employed is formulated as follows:

℞ Cocaine ..... .15 (grs. 2¼)
Ext. belladonna..... .20 (grs. iii)
Aqua valerian ..... .10 (ʒiiss)

The patient took in all 5 centigrams of cocaine. A purgative, calomel, given some hours later, brought about the expulsion of the tenia. The patient was kept in bed during the twenty-four hours that the treatment lasted.—*La Presse médicale,* Sept. 15, 1900.

**Neurasthenia.**—Hysteria, being a mental condition, says M. de Fleury (*Revue de Thérapeutique,* Sept. 1, 1900) should be cured by mental treatment, whereas neurasthenia, being the result of fatigue, requires tonic medication and rest. Of first importance is a selected but plentiful supply of food, with prohibition of alcoholic drinks or easily fermentable foodstuffs, and, on account of the poor quality of the gastric juice, but little liquid with meals. When the stomach is empty, however, large draughts of water help to flush out the kidneys and liver, and improve the nervous and mental condition. Baths, spinal douches, electricity, and massage tend to improve the blood and circulation, while the drug-treatment consists of calcium and sodium phosphate, the glycerophosphates, and the saline waters. Such stimulants as caffeine, kola, and their allies should be avoided. Isolation, forced rest in bed, superalimentation by gavage, the method of Weir Mitchell, ought to be reserved for the very severe and rebellious cases. Work, which at the beginning uselessly fatigues the patient and retards his cure, may later on become of much use.

**Raynaud's Disease.**—The general health must be looked after, writes J. T. Eskridge, and the affected parts well protected from the influence of sudden changes in the atmosphere. The pain may be relieved by:

℞ Ext. cannabis ind..... 0.01 (gr. 1/6)
Camphor. monobrom..
Caffeinæ citrat.....aa. 0.065 (gr. j)
Phenacetin ..... 0.2 (gr. iij)

and, if very severe, by hypodermics of codeine phosphate, 0.065-0.13 (gr. j-ij). Cates recommends nitroglycerin, 0.00065 (gr. 1/100), increased to 0.0013 (gr. 1/50), thrice daily for the relief of the arterial spasm. Massage is useful, with care, lest too vigorous manipulation of the affected parts result in abrasions or gangrene.—*American Text-Book of Applied Therapeutics.*

**Tuberculous Knee in Children.**—Camille Dupont advises systemic treatment at the outset. Keep limb in good position and immobilize the joint. In the peri-articular type allow walking without a brace, but require a brace in the osseous and synovial forms. For local treatment use compression and injections of camphorated naphtol, with chloride of zinc injections and tunneling of the bone in the peri-articular type. During convalescence allow the patient to walk slowly, and give gentle massage and salt baths.—*Journal de Médecine de Paris.*

**Epilepsy.**—The epileptic, being a depressed individual, is subject to digestive disturbances, so, by De Fleury's method of treatment, no water is allowed with meals, and the diet is such as to prevent gastro-intestinal fermentation. To eliminate toxic substances moderate exercise, purgatives, diuretics, and diaphoretics should be employed. Hydrotherapy, salt baths, massage, etc., with normal salt injections, are of benefit. Whatever affects arterial pressure may precipitate an attack. Combined bromides lower excitability of the cerebral cortex, and in nocturnal cases are given in large doses at bedtime. The author recommends quiet life in country villages.—Rommé in *La Presse médicale.*

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No. 111 FIFTH AVENUE, NEW YORK.

*Subscription Price, including postage in U. S. and Canada.*

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SATURDAY, NOVEMBER 10, 1900.


### *THE ABATEMENT OF A COLOSSAL NUISANCE.*

To the many in the profession, who for years have impotently nursed their outraged feelings at the constantly-increasing disfigurement of the landscape by both lay and medical advertisers, it will be a comfort to learn that a widely-organized effort is about to be made by the American Park and Out-Door Association to abate the nuisance. This society's plan of action, as outlined by the secretary of the special committee appointed by it to carry out the work, Mr. Frederick Law Olmstead, the well-known landscape architect of Brookline, Mass., shows such a broad and reasonable view of the matter that we feel certain of good results from its endeavors.

In a general way the Association proposes to instruct country landowners, from whose trees, fences, outbuildings, etc., the irresponsible advertiser announces his wares, of the meaning of such trespass and how redress may be obtained. It further proposes to limit the extension of the practice as carried on under purchased consent of landowners, by bringing communities to regard such purchased consent as a stigma of sordid vulgarity on the part of the landowners.

Through direct legislation the Association is less confident of accomplishing its aims, and yet if sufficient sentiment can be aroused, it feels that the course might be brought to reflect this public sentiment in their rulings. The specific ground upon which legislative aid is to be expected must be that of a public nuisance, and the difficulty here encountered is in bringing the courts to rule that objects offensive to the sight are nuisances. But even with this difficulty before it the society does not despair, because, as Mr. Olmstead says in his report, "The question of what is a nuisance and what is not seems to be wholly a matter of degree and of judgment, the courts of to-day, we understand, classing as nuisances many practices to which earlier courts found no objection. Mr. Olmstead says further, "A city, let us say, has spent a million dollars, or two millions or five millions, as the case may be, in forming a great park with the main object of providing a region of quiet, rural, sylvan scenery, to which people can escape for rest from the worrying distractions and the ceaseless turmoil of city life. These millions are expended so that from the incessant calls upon the attention that set the strain of modern city life at so tense a pitch, there may be at least a temporary relief in the quiet enjoyment of simple, peaceful scenery that does not clamor even to be admired. But if in going to the park and returning home again the people must fight their whole way through busy city streets full of distracting movements, sights and noises, they reach home with nerves all set on edge again and much of the value of the park is wasted. It is, therefore, to conserve the full value of its investment in the park that the city undertakes the additional expense of a parkway which shall provide a main line of approach attractive in itself and free as far as possible from features irritating to the nerves. For this purpose land is taken and paid for; for this purpose additional sums are spent in construction and planting; and swarms of tired people seeking quiet and rest pass along the route thus prepared."

"Incidentally the adjacent land is given a frontage upon the parkway and made visible to those people. The landowners then erect signs constructed and painted with the most devilish ingenuity to catch the eye at every turn, to cry out as loud as color and form and size can be made to cry, 'Here we are! You can't get away from us! Look here! Look here! Look here!' Ugly and crude in the main, though sometimes not ill designed in themselves, these signs obtrude all sorts of sordid ideas upon the mind and will not let it rest. Distraction is their aim and

motive, the very reverse of the motive which was held to justify the rest of the parkway."

We believe that every physician who practises in a city is keenly alive to the immense therapeutic possibilities of the public parkways and can testify to the jangle produced in the nerves by the insinuating advertisements which abound therein. And there, as usual elsewhere, the medical variety is most obnoxious. Wherever the tired eye ranges it is met on every side by reminders of the mortality of the flesh, and before the rest-seeker has traversed a hundred yards of park road he learns from the most reliable sources—the advertisements—that he is the victim of at least six different diseases, all equally serious and all demanding the immediate use of as many different specifics. He learns that up to this moment he has been in error with regard to the clothes he should wear, the food he should eat, the bicycle he should ride, the house he should live in. He discovers furthermore that he has never really drunk a gentleman's whiskey, never smoked a gentleman's cigar. As a consequence his mind is filled with terror of latent diseases, and torn with remorse for a life barren of gentleman's whiskey and educational breakfast oats; and he slinks back wearily to the city with his intellectual faculties so paralyzed that he cannot decide whether salvation lies in the path of pleasant purgatives or three-dollar shoes.

Seriously, it behooves physicians and boards of health to cooperate with the American Park and Out-Door Association in its laudable undertaking to free communities from this rapidly-growing nuisance, the morbidly suggestive landscape advertisement; and we sincerely hope that the day is not far distant when nerve-racked people may obtain respite from their troubles in the quiet haunts of Nature without being harried into the belief that they are in need of perpetual purgation, ethylic nerve electrifiers and educational oats.

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### THE RADICAL CURE OF HERNIA.

NOT many years ago any operation for the radical cure of hernia was regarded with suspicion by even leading surgeons. To-day it is considered by many to be a routine surgical procedure. The improvement in results has been due, not only to the improvement in surgical asepsis, but to the perseverance of certain persistent surgeons, who have improved the technic and evolved more correct theories.

While most persons dread a surgical operation, the promise of almost certain relief from the discomforts and insecurities of the truss holds out to them a much-wished-for deliverance from that disagreeable and uncomfortable piece of harness. A radical cure rarely—truss-makers say in 2 per cent.—follows the use of a truss, but only at the expense of long-continued discomfort. The majority of practitioners still advise their patients to get trusses and the results are often excellent. When the laity, on the other hand, order trusses themselves and put them on according to printed instructions they are often unnecessary and frequently do not fit. An ill-fitting truss does not properly hold up the hernia and it increases in size until some complication necessitates a hurried operation.

In an endeavor to present to conservative practitioners the advantages of the operation for radical cure over the treatment for relief by the truss, with the possibility of operation in extremity, J. Collins Warren (*Boston Medical and Surgical Journal*, Sept. 18, 1900) has discussed 98 cases of hernia operated on between the years 1888 and 1900 and has traced the degrees of greater success that has attended each step in improvement. These cases consist of 74 inguinal, 7 femoral, 12 umbilical, and 5 ventral hernias. The improvement in aseptic technic in later years is shown by the fact that since 1895 only 16 per cent. of the cases were septic, as compared with 48 per cent. prior to that date. The term "septic," as used by Warren, includes all cases which did not heal throughout by first intention, even those cases with the slightest stitch infection.

There are marked preferences among surgeons for different kinds of sutures in this operation. In two-thirds of Warren's cases silk sutures were used, sepsis following in only 17 per cent., while in 30 cases in which catgut was the suture material sepsis followed in 40 per cent.

The after-influence of sepsis is shown by the fact that relapses occurred five times as often after sepsis as after clean wounds, and that they followed the use of catgut sutures three times as often as when silk sutures were used. In 23 cases of inguinal hernia in which silk sutures were used no relapse followed, but one-third of the cases in which catgut was used suffered relapse. It would therefore seem that, as silk is easily sterilized, is stronger and more readily manipulated than catgut, it would be advisable to use it in preference. The opinion of Bull and

Coley, that silk is not as quickly absorbed as catgut, is not sustained by Warren who claims that it is quite as easily absorbed as chromicized catgut. The operation employed by Warren in the majority of cases was that of Bassini. Macewen's operation was used in a few of the earlier cases, but proved complicated and unsatisfactory.

The age at which operative treatment is most suitable is by no means agreed upon. There is always a good chance of a cure by the truss in children, but after twenty-one years the chances fall to 2 per cent. Bull and Coley give in a general way fifty years as the age limit for operative treatment for hernia, but Warren's hospital experience does not bear out this view. In a large number of cases operated on he found that nearly 20 per cent. were over fifty years of age and also that there were no recurrences reported among this number.

A hernia is generally conceded to be cured if there is no recurrence within a year after the operation. Warren was able to follow up 58 cases for a year or longer after the operation. Forty-five of these were inguinal hernias and a relapse was reported in 7 of them, giving 84 per cent. of cures. There was no recurrence in 3 cases of femoral hernia, or in 2 cases of ventral hernia, but in 8 cases of umbilical hernia there were three recurrences. A comparison of the number of cures obtained by operation on inguinal hernias prior to 1895 with the number obtained during the last five years shows a wonderful gain, due undoubtedly to improved technic.

As the operative treatment for the radical cure of hernia involves no mortality and is successful in 90 per cent. of the cases, it is to be hoped that practitioners in general will learn to appreciate it and employ it in all suitable cases. In childhood and youth, if the patient's parents are intelligent, the truss still has its place, but after the age of twenty operation should always be advised.

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### SALINE INFUSIONS IN PNEUMONIA.

THE outlook in the treatment of pneumonia has not undergone much modification for a number of years. Statistical analysis when applied to the reports of different methods has shown that the kind of treatment has not materially altered the mortality. Indeed, it can be said that careful nursing without drugs gives as good results as any other plan of treatment.

It has come to be recognized, in a broad general way, that pneumonia patients may be grouped into three classes, *viz.:* (1) Infants, healthy young people and robust adults; (2) double pneumonia in old age, alcoholism, complicating constitutional disease, and (3) severe pneumonia in unhealthy or debilitated patients, usually over thirty. In the first group there is a marked tendency of the disease to run its course without fatal result if proper nursing is maintained; the second class of patients almost always die; but in the third group there are a number which give occasion for the most persistent and anxious watching, and it is in such patients that treatment methods, if of value, can demonstrate their usefulness.

Within recent times two procedures which demand attention have been advocated, the antipneumonic serum and the treatment by subcutaneous saline infusions. With reference to the former, we are not yet in a position to maintain that a specific has been found. Many different sera have been tried, but as yet our knowledge is too fragmentary to warrant conclusions. The method offers, however, much for future development.

The second method is not as new as many of its recent advocates would claim. Its action is based on the assumption of a bacterial toxemia and is simply a logical extension of the method by bleeding, and perhaps offers its best results in the combination of the two methods. Penrose of Baltimore in 1899 advocated the method quite strongly, and Wells before the American Medical Association in 1899 went so far as to say that by the combined method of venesection and venous saline infusions pneumonia could be made a curable disease. Recently (*British Medical Journal*, Sept. 29, 1900) W. Ewart and Beaumont Percival of London have tried simple saline infusion in a number of patients who seemed to offer but the faintest chances of recovery. The results were not very satisfactory, only one case in six recovering, but the general impression gained was that the method was of value and that it was not followed by unfavorable complications and delayed rather than aggravated the fatal results. "The instalment of relief which was observed in some of the cases reported suggests that in patients with anxious prognosis, but not actually of the worst type, this mode of treatment might be capable of making a favorable and perhaps a life-saving impression upon the attack."

# ECHOES AND NEWS.

## NEW YORK.

**Dr. S. Purple.**—The President and Fellows of the New York Academy of Medicine hereby express their high estimate of the character of the late Dr. Purple, as a citizen and a physician; their earnest appreciation of his valuable services as a Fellow and an officer of the Academy, and their grateful acknowledgment for rare books and pamphlets presented by him in large numbers to the Library of which he was the founder. They earnestly desire to extend to the members of his bereaved family their profoundest sympathy in this, the hour of their sad affliction.

Wm. H. Thomson, M.D., President.
Louis F. Bishop, M.D., Secretary.

**Tuberculosis Hospital Site.**—From the daily press we learn that the efforts of the residents of Clinton County to secure the location at Dannemora of the proposed hospital for the treatment of incipient tuberculosis, and their opposition to the site at Lake Clear selected by the Board of Trustees appointed by Gov. Roosevelt, have aroused the residents of this section of Essex County to vigorous protest. A committee of citizens has adopted resolutions which are to be forwarded to the State Board of Health and the Forest Preserve Board, by whom the selection of the site is to be made. The resolutions are as follows:

*Whereas,* Desperate attempts are being made by certain politicians to prove that the Board of Trustees appointed by Gov. Roosevelt to select a site for a hospital for consumptive patients has erred in its judgment in a selection of Lake Clear,

*Resolved,* That we endorse this selection and commend the good judgment of the Trustees.

*Resolved,* That we condemn as unbecoming good citizens the motives underlying the efforts of the opponents of this selection.

*Resolved, That* Dannemora should be used for the same purpose for which the State originally selected it—namely, for people who are to be confined and punished, and not for people who are seeking outdoor life and recuperation.

*Resolved,* That convict labor on buildings to be inhabited by the criminal class and inside the prison walls is proper, but that such convict labor should not be put in competition with the honest laboring man in the outside world.

*Resolved,* That the surroundings in this penal colony are incompatible with cheerfulness, but, on the other hand, would have a tendency to produce melancholia, a condition most to be avoided in tubercular patients.

*Resolved,* That a copy of these resolutions be forwarded to the State Board of Health and the Forest Preserve Board.

## PHILADELPHIA.

**Women's Homeopathic Hospital.**—Dr. Mary Davis Ridgeway, for three years a member of the staff, has resigned in order to take a special course in surgery at Cornell University.

**Hygienic Church.**—The People's Church at Reading has begun the use of individual cups for communion service. The pastor is a pioneer in this line, having formerly introduced the custom in Baltimore.

**Municipal Hospital.**—The Board of Health has received a petition from the Women's Sanitary League asking that appropriate wards be fitted for the treatment of pay cases of scarlet fever and diphtheria. It is asked that the charges be made not more than $25 per week.

**Evans Estate.**—It is announced that the heirs and legatees have at last reached an agreement by which the estate will be settled in Philadelphia. As soon as the estate is turned into money the great dental institute will be begun.

**State Hospital for Insane at Norristown.**—The cost of maintaining the 2100 inmates during the past year was $3.29 each per week. The trustees have asked for one building for male consumptives, two for nurses and attendants, a pathological laboratory and a morgue.

**Conservative Surgery.**—Dr. B. F. Baer reports a unique case. The patient was a woman in whom tubal gestation was present. Abdominal section revealed a cystic condition of the opposite ovary which necessitated its removal. In order to save the pregnant tube the fimbriated extremity was dilated and by careful massage the contents of the tube were expressed. This maneuver was entirely successful and the patient made a good revovery.

**Selling Literature Intended for the Sick.**—An enterprising individual is turning a few pennies by soliciting magazines from people, under the representation of collecting them for hospital patients, and then disposing of them to dealers in second-hand books. This trick was exposed some two years ago. The perpetrator ceased his actions for a time, but has again begun his work.

**St. Joseph's Hospital.**—This hospital, which was formerly in some disrepute, is now making rapid progress. Abdominal operations were regarded as likely to be unsuccessful and ran down as low as two in one year. Last year there were more than 100 performed. A new departure has been made by allowing physicians to bring patients to the hospital and still retain full charge of the treatment. This is the only hospital in Philadelphia that affords such facilities.

**Filthy Streets and Diphtheria.**—An inspection of the streets in the sections of the city where diphtheria is most prevalent has shown some of them to be horribly filthy in spite of the efforts of the Board of Health to guard against such insanitary conditions. The paved streets are kept in good condition, but the unpaved streets and alleys are not. The Superintendent of Street Cleaning states that the latter do not come under his jurisdiction. The cases of diphtheria during the last week number 120. The total mortality of the city still continues unusually low.

**Hospital Charity.**—This question was under discussion at a recent meeting of the Medico-Legal Society. Efforts are to be made to secure legislation to district the city and place an overseer in charge of each district. Applicants for charity must then first apply to the overseer. This it is believed will lessen the abuse of promiscuous giving of charity by the various hospitals.

**Mother's Congress.**—The following resolutions were adopted at the recent meeting in Lancaster: (1) That we especially urge the women of our own State to work for the establishment of juvenile courts, for the complete separation of blameless from misdemeaning children, and for the care of all dependent children, as far as possible, in individual homes rather than in institutions. (2) Whereas, in Pennsylvania the women criminals are confined in jails and prisons, be it resolved that we urge the State Legislature to make an appropriation to establish a reformatory for women criminals similar to the one in Sherburne, Mass.

**Bacillus Aerogenes Capsulatus.**—An interesting case of known infection by this bacillus was recently treated at the Polyclinic Hospital by Dr. John B. Roberts. The patient was a girl who had sustained a compound fracture of the forearm, the skin opening being very small. In three days the forearm was gangrenous and multiple incisions were made with the hope of saving the arm. This was futile and the following day amputation at the middle of the arm was necessary. The flaps soon showed beginning gangrene, but this was finally checked and recovery followed. Examination at the Pepper Laboratory showed the presence of the bacillus aerogenes capsulatus which had invaded the blood-vessels as well as the tissues.

**County Medical Society.**—At the meeting of October 24th, Dr. A. H. Dare demonstrated a new hemoglobinometer. The instrument is adapted to the use of undiluted blood and has the following points in its favor: (1) The stratum of blood is always constant. (2) The possible error due to coloring introduced by diluting fluid is done away with. (3) The reading is made through a camera tube with achromatic lenses which magnify the color field about three times. A comparison with Oliver's method in a series of 500 cases shows an almost exact correspondence in the readings. Since blood-work is becoming of such importance the cost of this instrument, $15, makes it accessible to the general practitioner.

Dr. Henry W. Stelwagon gave a report of his visit to the Finsen Institute in Copenhagen where skin diseases are treated by concentrated light rays. Dr. Stelwagon will soon have a sun apparatus in operation at the Howard Hospital and later expects to have an electric appliance for the same purpose. The results will be awaited with interest.

Dr. Norman B. Gwyn of Batimore read a paper on the occurrence of typhoid bacilli in the urine and the means of disinfection. Recently experiments have been made with various disinfectants. Milk of lime scarcely deserves this name. The three most useful are bichloride of mercury, chlorinated lime, and liquid chlorides. Chlorinated lime is one of the most reliable, 30 cc. completely and almost immediately disinfecting 1200 cc. of urine. Two-tenths the volume of infected urine of one-to-one-thousand bichloride solution will thoroughly disinfect it in five minutes.

## CHICAGO.

**Medical Inspection of Public Schools.**—At a meeting of the Physicians' Club, held October 29th, the following resolution was presented and adopted: Resolved, that it is the judgment of the Physicians' Club of Chicago that the results obtained by the medical inspection of the schools of Chicago demonstrate the high sanitary value of the system. As a life-saving measure it is of the greatest importance to the City of Chicago.

**Visiting-Nurse Association of Chicago.**—This Association was recently incorporated and a charter was applied for and granted. The object of the Association is to furnish trained nurses to those otherwise unable to secure skilled attendance in time of illness, to teach cleanliness and the proper care of the sick. At the end of the first year of the Association's work there were four nurses in its employ and 771 cases had been cared for. At this, the eleventh year of the Association's life, there are fourteen nurses and more than 500 cases a month are cared for. A corps of twenty untrained or emergency nurses, who work under the supervision of the doctor and visiting-nurse, has proved of untold value to hundreds of cases where the daily visit of the visiting-nurse is not sufficient for the proper care of the case.

**Gift of Dr. Senn.**—Dr. Nicholas Senn recently gave to Rush Medical College $50,000 which insures the beginning of a building project which will give the College the finest and best equipped structure for clinical work in the West. Architecturally the structure will follow the Italian Renaissance, the first few stories being of stone, and the four upper stories of terra-cotta and brick. The recitation room and the dispensaries will occupy the first, second and third stories. They will be equipped with all the latest improved medical and surgical appliances. On the fourth floor will be the laboratories. Their equipment will be the finest and most modern. The fourth floor will be connected with the Presbyterian Hospital Building by a covered bridge. Two amphitheaters for clinical work, capable of seating 150 students, will occupy the fifth floor.

**Testing the Eyesight of School Children.**—The fact that dulness of eye is closely related to dulness of mind has been conclusively shown by Professor Smedley, Supervisor of the Board of Education's Department of Child-Study. Among the deductions made by Professor Smedley from the

mass of statistics, as the result of examinations, are these: (1) Dull pupils have a greater number of eye defects than brighter pupils. (2) Defective eyesight causes dulness in the child. (3) The primary rooms in the public schools have the poorest light. (4) Boys have better sight than girls. (5) School-life is responsible for many eye defects. (6) The first three years of school-life increase eye defects one-third. (7) Of pupils whose sight is but one-tenth the keenness of normal, the number grows steadily larger from the beginning to the end of the school-life. (8) While in ordinary schools 32 per cent. had only two-thirds of ordinary keenness of sight, in one school 48 per cent. had that degree of eye defects. (9) Such defects undoubtedly were the cause of the presence of many of the pupils in that school. (10) Something must be done at once, at almost any cost, to save school children's eyes.

## GENERAL.

**Portrait of Dr. La Costa.**—In response to the many requests for the portrait of the late Dr. J. M. Da Costa which appeared in the MEDICAL NEWS of September 15th, there have been prepared impressions, specially printed on heavy paper measuring eleven by fourteen inches, suitable for framing. These may be had at twenty-five cents each, by addressing a request to the MEDICAL NEWS.

**Obituary.**—Dr. Louis W. Read died at his home in Norristown, Pa., last week, aged seventy-two years. He was born in Montgomery County, Pa., in 1828 and graduated from the medical department of the University of Pennsylvania in 1849. When the Crimean War began he offered his services to the Russian Government, was accepted and served throughout the war, effecting important improvements in the treatment of gunshot wounds which were afterwards adopted in the United States and Europe. In 1861 he was appointed surgeon of the First Pennsylvania Reserves and later was made surgeon of United States Volunteers. In 1864 he took charge of the McKean Hospital in Baltimore where he served two years. He was surgeon-general of Pennsylvania and at the battle of Gettysburg removed a bullet from the body of Gen. Hancock after several other surgeons had failed.

**War Against Osteopathy.**—Swan L. Thompson, an osteopath, has just been fined $50 in the police court of Milwaukee, Wis., and ordered to pay the costs of his prosecutors, the Wisconsin State Board of Medical Examiners, for illegally using the title "doctor." The penalty is the same as that imposed in the cases of the Christian Scientists, who were convicted on the same charge. Mr. Thompson was accused in addition of illegally practising medicine without having a license, but this charge was abandoned by the prosecution under the spirited defense made to it. When the conviction was announced notice of appeal was at once filed and the osteopaths of the State, who are behind Mr. Thompson, say that it will be pressed. They assert that they have as much right to affix to their names the letters D. O., as Mr. Thompson did, as other persons have to use D. D. or LL. D., because they have studied at a college of osteopathy and are thoroughly versed in that system of treating disease. In the course of the prolonged hearing of the case several osteopaths went on the stand and explained the course of treatment they believe in. One of them on demand demonstrated with a skeleton that he had a scientific knowledge of the human body. The State Medical Board complained that pamphlets were illegally sent out by Mr. Thompson explaining osteopathy as a system of healing without drugs by using the bones as levers and so exciting the nerves as to cause the muscles to contract and produce a venous flow of blood to the heart. Osteopathists believe that disease is the effect of a local or general disturbance of blood and that a natural flow of blood is health. Counsel for Mr. Thompson contended that if osteopathic treatment was against the law it was illegal for trained nurses and Turkish bath attendants to treat sick persons. The osteopathists hope to secure a law which will put an osteopath on the State Board of Examiners and regulate their schools like other medical schools.

**Training School for Nurses.**—The United States Civil Service Commission announces that on November 20-21, 1900, an examination will be held in any city in the United States where it has a local board of examiners for the position of superintendent and trained nurse, Training School for Nurses, Freedmen's Hospital. The examination will consist of the subjects mentioned below which will be graded as follows:

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| 1. | Essay (not less than 300 words) | 12.5 |
| 2. | Anatomy and physiology | 12.5 |
| 3. | Hygiene of hospital wards and sick-room | 10. |
| 4. | Routine requirements of hospital ward and sick-room | 10. |
| 5. | General nursing | 10. |
| 6. | Surgical nursing | 12.5 |
| 7. | Obstetrical and gynecological nursing. | 12.5 |
| 8. | Experience | 20. |
| | Total | 100 |

Applicants must be graduates of reputable training schools for nurses, and must have had at least three years' experience in hospital nursing. Age limit twenty years or over, but the Department desires that preference in certification be given to unmarried females between twenty-five and fifty years of age. From the eligibles resulting from this examination it is expected that certification will be made to the position of superintendent and head nurse, Training School for Nurses, Freedmen's Hospital, Washington, D. C., at a salary of $900 per annum, and to other similar vacancies as they shall occur. This examination is open to all citizens of the United States who comply with the requirements and

desire to enter the service. All such persons are invited to apply, and applicants will be examined, graded, and certified with entire impartiality and wholly without regard to any consideration save their ability as shown by the grade attained in the examination. Persons who desire to compete should at once apply to the United States Civil Service Commission, Washington, D. C., for application forms 304 and 375, which should be properly executed and promptly filed with the Commission.

## CORRESPONDENCE.

### *OUR LONDON LETTER.*

[From Our Special Correspondent.]

LONDON, October 24, 1900.

CASE OF PLAGUE AT CARDIFF—THE GLASGOW PLAGUE OUTBREAK—REPORT OF PROF. ZABOLOTNY OF ST. PETERSBURG—PRECAUTIONS IN LONDON—THE RISK OF INFECTION FROM THE BOOKS OF PUBLIC LIBRARIES—OPENING OF NEW SCIENCE LABORATORIES AT KING'S COLLEGE—DISASTROUS EFFECTS OF THE WAR ON HOSPITAL FUNDS.

A FATAL case of plague has occurred at Cardiff on October 4th. The ship "Southgarth" arrived in the Tyne from the River Plate. One of the crew landed at South Shields, where he was taken ill on September 21st. He went to his home at Llandaff, where he arrived on the 27th. He was supposed at first to be suffering from typhoid fever, but plague was afterward suspected. Bacteriological examination of the blood and cultures from the bubo showed the presence of the bacillus pestis. He was removed to the Cardiff Fever Hospital in a dying condition. A nurse volunteered to take the case, and within twenty minutes of the man's arrival, he and the nurse and an attendant were completely isolated. He died on October 4th. The necropsy and inoculation of a guinea-pig confirmed the diagnosis. By consent of the widow his body was cremated. During a fortnight five ships have arrived at Cardiff from ports at which plague has been reported. Seven hundred rats have been destroyed, no less than 134 having been found on one ship. Their bodies were burned. The Local Government Board sent one of their inspectors, Dr. Buchanan, to Cardiff to investigate the arrangements made to check the spread of plague, and he has satisfactorily reported on them.

The outbreak of plague in Glasgow appears to have been completely checked. There are now 20 cases in hospital and it is twenty-six days since the last case was discovered. One more death has occurred. A most interesting report on the outbreak has been published by Prof. Zabolotny, of the Imperial Institute of Experimental Medicine of St. Petersburg, who has spent several weeks in Glasgow on behalf of his Government. In recent years he has been a member of the Russian Expedition for the study of plague in India, Arabia, China, and Eastern Mongolia. Before leaving Glasgow he drew up the following conclusions which he conveyed to the Medical Officer of Health: (1) The epidemic when compared with that of India, China, and Africa, and with those of Europe in recent years (Oporto, Kolobowka), is of the mildest description. (2) The extension is not great and the mortality is insignificant, which may be attributed to the energetic sanitary measures. (3) For the most part the cases are bubonic, which are epidemiologically less dangerous than the pneumonic cases. These latter are excessively contagious, because the sputum teems with plague bacilli. (4) As in the bubonic form contagion takes place only by contact with the skin, isolation and cleansing of linen play a most important *rôle* in prevention. (5) For persons in contact with the sick the best method of protection is the injection of 10 to 20 cc. of serum, as here practised. Treatment of patients is most effective with large intravenous injections (60 to 120 cc.). (7) The necropsies of fatal cases show a picture of protracted illness (suppuration nodules, mixed infection), and not that of an acute malady terminating fatally in from two to three days.

Should an outbreak of plague take place in London it is proposed to admit patients to the fever hospitals of the Metropolitan Asylums Board. But the *British Medical Journal* doubts very much whether these hospitals could supply the accommodation, for cases of scarlatina and diphtheria are constantly refused admission owing to lack of accommodation. The *Journal* thinks that temporary wooden hospitals, which could be destroyed by burning, should be constructed. Again, how about nurses? No doubt many heroic women could be found; but the question of infection is a serious one. Out of a staff of six nurses in Hong-Kong two contracted the disease and died. As a precautionary measure it is thought that nurses should be asked to volunteer at once to be injected with Haffkine's prophylactic serum. It will not do to wait until they are called upon to nurse plague patients.

A paper by Mr. MacAlister, Librarian of the Royal Medico-Chirurgical, and Dr. W. G. Savage, Bacteriologist to the Cardiff Public Health Laboratory, dealing with an "Investigation into the Amount of Risk of Contracting Infectious Diseases by the Use of Public Library Books," read at the annual meeting of the Library Association at Bristol, is of great practical importance. From time to time the public are frightened by the suggestion that during epidemics the books of public libraries are a grave source of infection. But the authorities generally believe that if reasonable precautions are taken by notification and withdrawal of infected books there is practically no danger. The authors of this paper hold that there is no ground for drastic measures, and that there would be more justification for stopping all

public conveyances and prohibiting all social gatherings during an epidemic than for closing the public library. For the purposes of investigation soiled library books and new books were used for weeks by patients suffering from diphtheria, typhoid fever, and tuberculosis, and then subjected to bacteriological examination. The result was that it appeared impossible for infection to be conveyed by means of books. But there was one exception: By wetting the thumb and turning over the leaves of an infected bo it was found possible to convey germs to the mouth.

New science laboratories will be formally opened at King's College, London, on October 30th, by Lord Lister. The Lord Mayor and sheriffs will take part in the ceremony, and a great number of invitations have been issued to representatives of learned societies, medical schools, etc. The structural alterations required and the new equipments have cost $100,000, which has been in part generously subscribed by the public in spite of the demands for the various war funds. The College will now have laboratories for physiology, bacteriology, biology, botany and geology which can compete with the best continental ones. The bacteriological department, which has been the most complete attached to any medical school in England, has been greatly enlarged. There will be a technical laboratory, a new class-room, a research-room, and bacteriological library.

The Boer war has had widespread commercial effects. It has affected the prices of everything from a cup of coffee to a scrubbing-brush, and from a pair of boots to a football. A very serious consequence is the influence on hospital finances, which in one or two cases has been almost disastrous. The following decreases in the revenues have occurred: St. Thomas's, £7500; King's College, £2900; Orthopædic, £1000; Cancer, £4928; Great Northern, £2076. In the case of a few small institutions insignificant increases (from other causes) have occurred. From 39 out of 87 different medical institutions to which a note of inquiry was addressed a reply has been received. These 39 report a total loss of £20,000. The extraordinary amount subscribed by the public to various war funds has diverted the stream of charity.

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## *TRANSACTIONS OF FOREIGN SOCIETIES.*

### *German.*

NORMAL AND PATHOLOGICAL BILE SECRETION—UNUSUAL SEQUELAE OF GONORRHEA—CEREBRAL INFLAMMATION—APPENDICITIS LARVATA—NEW APPARATUS FOR BLOOD TRANSFUSION—POST-OPERATIVE ILEUS—RUPTURE OF THE UTERUS—DURATION OF GESTATION—MARTIN'S TREATMENT OF THE UMBILICAL CORD.

BRAUER (Heidelberg) at the Seventy-second Assembly of the Deutscher Naturf. u. Aerzte in Aachen, September 16 to 22, 1900, rehearsed his conclusions upon the normal and pathological composition of freshly-secreted bile in order to establish some relation between it and disease. Hitherto such work has been confined to the autopsy-table and on this account is certainly too untrustworthy to be of scientific interest. Of more recent years advance in diagnosis and in surgical technic has led to more and more frequent operation for gall-bladder disease with the common establishment of fistulæ from which most of his human specimens have been gathered. The other and wider source of bile were animals in which fistulæ, various diseases and drug intoxications were produced. The chief point investigated was the influence of bile acids on the total production of bile. His results indicate that after a definitely long persistence of a fistula the total output of the bile and of the biliary acids sinks to a definite level. The loss in the acids of the bile must be renewed through the food if the secretion is to remain at its normal state, because the liver needs a definite quantity in order to produce bile in sufficiency and health. Again the nutritive influence of the bile upon the other glands of the body is very similar to it upon the liver itself, and this seems to account for the failure of gland function and of general nutrition seen in animals with fistula. Hence is the importance of determining the actual quantity of bile as an index of the real liver activity. The next field surveyed is that of pathological bile. In health not even traces of sugar were found, even when four per cent. of it appeared in the urine of alimentary glycosuria none could be detected in the gall. But on the other hand one dog having pancreas diabetes developed in three or four days 5 6/10 per cent. glycosuria and 1 2/10 per cent. sugar in the bile and a second dog showed 3 6/10 per cent. and 8/10 of 1 per cent. respectively in each. Whether in this disease hyperglykemia is produced or whether through changes in blood-pressure or through the too rapid conversion of the glycogen sets up glycocholia has still to be decided. Interesting results followed deep intoxication with ethyl and amyl alcohol. Distinct albuminocholia was found disappearing in about three days, more pronounced in degree with amyl alcohol. Epithelial casts were present, many of them dichotomously arranged. With exhibition of potassium iodide cylindroids, much longer, contorted spirally, appeared. Further many cells very like hepatic parenchyma cells were found. These circumstances support the theory of Aufrecht that in cirrhosis of alcoholic origin the parenchyma is first affected.

EULENBURG (Berlin) said the gonococcus is known to be the cause of remote sequelæ. Arthritis, endocarditis, pelveo-peritonitis, neuroses, neurasthenia, chorea, sterility and impotence are the diverse possibilities of this germ. He has observed lately distinctly localized nerve lesions and has differentiated neuralgia, neuritis with paralysis and muscle atrophy and paralysis and myelitis, including fourteen instances of neural-

gia, four of muscle atrophy with paresis and one of myelitis. Neuralgia attacked the nervus ischiadicus, tibialis, radialis and ulnaris. In the first named, associated nerves like the femoral, obturator and genitocrural were often involved. All the patients were young and all the neuralgia began between the second and seventh months after the original infection. Muscular atrophy appeared in the neighborhood of joints affected by the disease, and were it not for the ascertained cause would have made one think of juvenile atrophy. One case of myelitis with endocarditis and arthritis resembled tabes dorsalis in its other symptoms, absence of patellar reflexes and great pains in the lower extremities. Cure followed three years of treatment. The diagnosis rests upon the presence of the germ; in absence of that, upon a careful history of an attack and the results of a thorough physical examination. Iodipin is of therapeutic value in the treatment.

R. LENZMANN (Duisburg) reported a few additional cases of what Ewald has termed *appendicitis larvata*, characterized by variable attacks of dull pain about the gastric and umbilical regions, nausea, vomiting, diarrhea, little or no pain or tenderness about the region of the disease, but a readily and distinctly palpable appendix. The diagnosis was cleared in each case by the operation and the lesions were in each infiltration of the whole parieties, ulcers of the mucosa and adhesions. The explanation of the referred pains seems to be the anastomosis of the inferior mesenteric plexus with the solar plexus by means of the gastric nerve.

M. DINKLER (Aachen) in the light of four recent cases in his practice described the effects of inflammation in the cerebrum among children. He exhibited a case of right posthemiplegic athetosis with a history of diphtheria, then encephalitis with hemiplegia and finally athetosis. Tendon transplantation was the suggested treatment. The brain of a hemiplegic child was shown in which the cause of disease appeared to be a very large posthemorrhagic cyst.

WEINTRAUD (Wiesbaden) exhibited the apparatus for blood transfusion, having simplicity, practicability, painlessness and asepsis in its favor. When the veins of the upper arm are subjected to elastic ligature the pressure rises to 75 to 85 mm. of mercury and equals about 1 m. of water-pressure. This fact is taken advantage of in the simple device which consists of two small cannulæ inserted each into the vein of the patient and the blood-giver. With the latter the sterile rubber tube, with connections at the ends, is attached and, after blood flows freely from it, is connected with the patient's cannula. In from 5 to 10 minutes, through fine tubes, 150 to 250 c.c. of blood will pass. If salt solution also is desired a T-tube with a vertical arm, a meter long, dipping into the solution, may be inserted in the course of the rubber tube.

WINTERNITZ (Tübingen) considers embolism of the lungs and ileus two unfavorable factors in any operation which are entirely beyond the surgeon's responsibility. Ileus may be septic, after a septic peritonitis, mechanical without sepsis after occlusion by adhesious kinks or twists, paralytic by nervous action or by inexplicable cause as occurs often after total extirpation of the uterus. He reported eleven cases of post-operative ileus, 5 after total vaginal hysterectomy, 3 being septic, 7 mechanic without sepsis, and 1 paralytic, observed among 459 laparotomies, 280 vaginal hysterectomies and 98 colpoceliotomies, a total of 837 cases. The septic cases were not saved by a second operation, but 6 of the mechanical cases were. He holds that by careful observation of the symptoms and physical signs from the first day of the operation it is possible to differentiate the septic from the purely mechanical varieties. Peritonitis presents early invasion, commonly fever, uniform meteorism, universal tenderness. Mechanical ileus has delayed invasion, rarely fever, always elevation of pulse, commonly localized meteorism and tenderness, visible and palpable movements of the gut at some point which are accompanied by acute pain and increased tenderness. Under these signs a second operation should always be done. As to the time when such should be undertaken he laid down the following rules. If no flatus is passed and the earliest symptoms of ileus appear, consisting of singultus, vomiting, especially of green fecal matter, massage and lavage are resorted to. If these symptoms continue and in addition meteorism, fall of temperature and rise of pulse-rate ensue, a secondary operation should at once be done on the diagnosis of mechanical ileus. The further salient points of the subject were enumerated as follows: First, in purely mechanical ileus due to vaginal operation treatment must be undertaken through the original route, later in the face of failure, laparotomy must be done. Second, original laparotomy wounds must be opened, adhesions freed and then the obstructed gut emptied entirely of its contents by incisions at various points through which it is stripped clean. These openings must be carefully sewn and the toilette of the peritoneum rigid. Gloves are in these cases recommended. Third, these procedures are useful also in paralytic ileus and should be followed in promising cases. In true septic cases the frequency of failure almost contraindicates interference.

FRANZ (Halle) reviewed twelve examples of uterine rupture, ten of them complete. The signs of the approach of this calamity are not always definite. In only one of his four patients were there indications of undue tension and stretching. Even the actual presence of a rupture may have very few manifestations. The causes of death are bleeding and infection. So frequently are they infected that it would be well to treat all on that basis and to resort to the radical operation. The vaginal route for extirpation is the best. If radical ablation is refused, then a purely expectant plan should be first tried.

VON WINCKEL (Munich) presented a tabulated report on the duration of gestation. He as-

sumed the premise that the weight of the child bears direct relation to the length of the pregnancy. His observations include only children weighing four kilos or more. In 1007 instances he elicited as accurately as possible from the parents the date of the last menstruation and the most likely date of the conception. The lowest level appeared as 280 days after the first well day following the last menstruation or 275 days after the probable conception, the highest level included 321 and 336 days. He now subdivided his series into groups according to 10 days, namely, 280 to 290 days, 290 to 300 days, and so on. In this manner he discovered 31 examples of very long gestation, one well over 310 days. From these facts he asserts that in legitimizing offspring a pregnancy of 310 days should be acknowledged by law.

WIRTZ (Köln) presented the results of 150 cases of treatment of the navel in the newly-born by the method of Martin, namely, ligation with silk close to the navel and burning down to it with the actual cautery. This procedure has the advantages of securing more rapid falling-off of the stump, more prompt and smoother healing of the core, simplicity of management, and decreased danger of infection. Putrescence of the navel-wound, through absorption in the excoriations caused by the silk against the tender skin of foul bath-water, was not observed. Hematomata following cutting in of the silk has also not occurred. As the scab-tissue in the core from the burn possesses certain affinity for moisture, he suggests a wet dressing of alcohol which will both sterilize, dry and harden.

## SOCIETY PROCEEDINGS.

### *NEW YORK NEUROLOGICAL SOCIETY.*

*Stated Meeting, Held October 2, 1900.*

J. Arthur Booth, M.D., Chairman *pro tem.*

**Periodical Psychoses.**—Dr. A. B. Defendorf read this paper. He said that years ago all forms of insanity were looked upon as more or less periodical, but gradually this list has been reduced to periodical mania and periodical melancholia. The English and American observers have been slow to recognize periodical insanity. The record of hospitals for the insane show it to constitute a not inconsiderable percentage of cases admitted, coming second to dementia precox. These cases are characterized by intense psychomotor restlessness, exhibiting no signs of fatigue after weeks or months of excessive motion, and by unclouded consciousness, except in the extreme maniacal condition called delirious mania. These patients are rich in words if not in ideas. Delusions, when present, are transitory and are usually of the expansive type. The patients are happy and contented, yet they change very suddenly from happiness to melancholia or *vice versa*. In the depressive form, the associations of ideas show retardation, and the emotional attitude is uniformly one of depression or despair. More or less stable delusions are present. Cases are found showing both the maniacal and depressive elements, but usually one or the other predominates. The most prominent etiological factor is defective heredity, found in from 70 to 80 per cent. Other causes are shock, acute diseases and mental strain. When the first attack occurs after childbirth it is apt to recur with each succeeding confinement and continue after the climacteric. The first attack is apt to be of the depressive form. More than half of the cases occur before the age of twenty-five. As the attacks are repeated, the lucid intervals, during which the mental faculties are fully retained, tend to shorten. The prognosis of the psychoses is bad. During the height of the disease, or in the extremely maniacal or depressive forms, death may occur from exhaustion, or may be self-inflicted. The author's conclusions were: (1) Periodical insanity is characterized by a definite symptomatology, which permits of differentiation in the first attack; it is a prominent psychosis.

Dr. B. Sachs said that although all recognized the existence of such a thing as periodical insanity, danger lurks in the term because almost all forms of mental phenomena are apt to exhibit a tendency to recurrence. For this reason a regular recurrence of, for instance, mania and depression, with perhaps a lucid interval, should be insisted upon. It was rather curious that those describing periodical insanity insist that there must be marked depression. He could recall a case of distinct hypochondriasis followed by a lucid interval of seven years and then an attack of pronounced melancholia. There was again a lucid interval followed by an attack of mania. Attention was called to the remarkable suddenness with which the patient passes from one state to another. He had had under observation a girl who had been in a state of depression for over eight months, and then very suddenly had had a lucid interval lasting one year. This had in turn been followed by acute mania.

Dr. W. D. Granger said that a few cases of undoubted circular insanity were so decided in their symptoms that they could not be mistaken for anything else. This was particularly true if the person was seen late in life, and had a history of recurrent attacks extending over many years. There were, however, many cases less pronounced in type, rendering it difficult to classify them. He had personally seen only a few cases of circular insanity. He had never seen the sudden changes referred to by the last speaker, nor had he ever seen a case of true incoherence in connection with circular insanity. He had seen several cases of recurrent insanity in which there were from two to five attacks of rather mild melancholia. He had had under his care a young woman suffering from this form of insanity, and also her mother, brother and sister. The sister had a most violent mania, proved at

autopsy to have been a complication of typhoid fever. She had also periodical attacks of active though not violent mania. Another form of the circular type that he had noticed and had never seen described in the text-books was the form of chronic mania developing, in the last few years of life, recurrent attacks of mania and melancholia.

Dr. William H. Thomson said that he had had under his continuous observation for ten years a case of periodical insanity—probably the only one to which he would be willing to apply the term. The attacks had recurred regularly every other day all these years. The patient was a man, forty-eight years of age when the disease had first set in. There was no hereditary psychosis. At the beginning he had been attacked with melancholia and had attempted suicide. Attention had been early directed to the fact that his condition was worse every other day, and for this reason he had had most thorough and persistent antimalarial treatment. When first seen by the speaker, his memory had been good, and he had been in no way irrational. The temperature had been normal. The next day his temperature had risen to 101° F. and he had become delirious. On the following day his condition was that noted at the first visit. The febrile symptoms ceased after about three months, but in other respects the case had kept up this alternation ever since that time. Examination of his secretions had thrown no light whatever on the etiology of his singular mental disturbance. The type was that of melancholia with excitement. He had never been truly maniacal. Regarding periodical psychoses in general, Dr. Thomson said he could not agree with the reader of the paper that they constituted such a definite class, for, if so, they should be definitely periodical. Another case was then cited in which the attacks had begun with talkativeness and an appearance of well-being, which commonly lasted for about six weeks, and were then followed by extreme mental depression. At no time was there any confusion of personality or any delusions. The attacks of mental paresis lasted two or three months, and usually came on every winter. Such a case seemed to him a true example of periodical psychosis, but many of those described in the paper seemed to him to come rather under the head of relapsing than periodical insanity.

Dr. William M. Leszynsky said that no one could tell at the first attack whether there would be recurrence or not. With a good previous history it was an entirely different matter.

Dr. L. Pierce Clark said that while in a hospital for insane he had seen a case of intermittent mental stupor which recurred at short and fairly regular intervals, thus resembling in some respects the case reported by Dr. Thomson. Such cases were very rare, only six being on record. Sudden transitions were quite characteristic in the mental disorder first described by Charcot in connection with mental epilepsy.

Dr. Defendorf said that the periodicity, and that an irregular periodicity, is the characteristic of the whole course of the disease throughout the life of the individual. But there are certain fundamental symptoms, such as the condition of the memory, the tendency toward deterioration, and the character of the delusions and hallucinations upon which the diagnosis should be founded. Relative to the sudden transitions from one state to another, he said that this occasionally happens over night.

**Status Epilepticus: Its Nature and Pathology.**—Drs. L. P. Clark and T. P. Prout presented this paper, Dr. Clark reading the clinical portion. About forty-five cases formed the basis of the paper. Unfortunately only five cases could be studied histo-pathologically. The modern notion of status is that it is the acme or true climax of the disease, and not, as formerly supposed, a chance termination of epilepsy that by proper treatment could have been avoided. It is a state of epilepsy in which one seizure follows another so closely that the previous psychical exhaustion is not recovered from. One case at the Craig Colony for Epileptics had 384 typical psychic seizures in one day. It occurs with about equal frequency in all the different forms of epilepsy except that dependent upon organic brain disease. The latter constitute one-half of all the cases of status. Exhaustion paralysis is very characteristic of status. No foundation had been found for the statements of some writers that either age or sex exerts any influence. According to their experience, the shortest intervals had been in those developing their epilepsy between the age of ten and sixteen years. On an average, eleven years elapse between the beginning of the epilepsy and the occurrence of status. Menstruation in women does not seem to be productive of status. In the great majority of cases the approach of status is denoted by a steady increase in the frequency of the epileptic seizures. They had seen 300 attacks a day in several cases, and still recovery had occurred. One case had had status epilepticus for twelve days, and had recovered, having had during this time 1800 seizures. The temperature elevation in status usually begins after the first severe convulsion, and there is usually a direct ratio between the number and severity of the convulsions and the elevation of temperature. The record of the pulse, temperature and respiration frequency gives the best indication of the severity of the status. Generally the maximum of the fever marks the maximum of the seizures, and if the fever persists after this one should be led to suspect some complication. Occasionally the fever subsides by crisis. Occasionally also the temperature rises to 107° or 108° F. As to the cause of the fever curve, he said that some look upon the elevation of temperature as purely psychical, while others believe it is the result of a direct effect on the heat center. The pulse-rate increases in frequency with each attack, but the pulse curve

usually runs nearly parallel to the temperature curve, though responding more slowly on recovery from status. Almost always there is Cheyne-Stokes respiration, but it is not so unfavorable a symptom as in some other disorders. Both pneumonia and pleurisy are fairly frequent complications. The prognosis of status is necessarily grave. A low temperature is supposed to be a fair sign, though there may be recovery after a temperature of 107.5° F. Paralysis of the muscles of deglutition is a very unfavorable sign. The gradual, steady increase in the symptoms is the most unfavorable sign of all. Many patients have a record of two to five status periods, and it is probable that the mortality does not exceed 25 per cent. It is possible to abort a case of status if taken in time, and certainly the present mortality should be reduced. The plan of treatment pursued in the cases mentioned in the paper was as follows: At the outset, the patient was given a dose composed of 25 grains of bromide, 20 grains of chloral and a large dose of opium and morphine. If the convulsions are not controlled, thirty or forty grains of chloral are given by the rectum, and if this is not sufficient, bromide is given hypodermically in a part of the body that will be the least painful if abscesses form, as they often do after such injections. The latter are very painful and should only be given in the stuporous stage. They usually control the condition.

Dr. Prout then took up the pathological side of the subject. He said that the modern belief was that the epileptic storm has its seat in the cortex. Recent experimental research seemed to warrant the following conclusions: (1) That the transmission of the impulse in epilepsy is through the extrapyramidal tracts which transmit motor reflex impulses; (2) that the sensory portions must be irritated in order to produce the fit, and (3) that the fit appears to be a complex reflex phenomenon. The paper was founded on a study of 13 cases. In all but two the post-mortem examination was made within seven hours after death. The changes found in the brain are by far the most pronounced in the status cases. The degree of chromatolysis seems to depend upon the number and severity of the convulsions. In the cells of the second layer the nucleus is swollen markedly; the nuclear membrane is hazy and indistinct, and the nucleolus is frequently replaced by a granular mass. These are especially numerous in the status cases. Many nucleoli were found far removed from the cells to which they belonged. He had examined the normal human brain with regard to this nucleolar extrusion, and had found it comparatively infrequent. Leucocytes clinging to degenerated nerve-cells were also very frequently observed. The neuroglia were studied in seven cases, and the conditions found to vary a good deal. A broadening of the outer cortical layer was fairly constant, and occurred apparently at the expense of the cortical layer. The condition of the neuroglia seemed to depend largely upon the condition of the epilepsy. It was more pronounced in the insane epileptic than in cases of simple epilepsy. When morbid processes attack the nucleus, the vitality of the cell itself is endangered. The increase in the neuroglia is the result of nerve-cell destruction. The author's conclusions were: (1) It would seem that epilepsy is essentially a sensory phenomenon; (2) the essential lesion pertains to the nucleus of the cortical cells and jeopardizes the cell; (3) the chromatolysis is probably a nutritional change brought about by the jeopardization of the nucleus; (4) the rôle of the leucocyte in the cortex after severe convulsions is most probably that of the phagocyte; (5) the neuroglia proliferation in epilepsy is one of the more remote consequences, and (6) epilepsy is a progressive disease of which status is the climax.

Dr. Schlapp said that he had had occasion to treat two cases of status during the past summer, and both had recovered. One case had had thirty attacks in eight hours. She had then become stupid and had finally developed hallucinations, the whole condition lasting two weeks. In both of the cases there was such a large quantity of albumin in the urine that the latter became solid on boiling. He thought this condition was commonly present in status. He did not think it right to assume that the second or third layer of cells could be taken as sensory cells, so much depended upon the particular region of the brain. Most of these cells were now looked upon, in opposition to the theory of Bruce, as associated cells.

Dr. Defendorf asked regarding the temperature of the case dying of status. He had had an opportunity of studying two cases, and in both there had been what had been called "acute alteration." This was often found in other conditions, particularly where there had been high temperature.

Dr. Sachs asked whether in these cases of status epilepticus gross changes had been found that might, in some way, have accounted for these cell changes. A number of years ago he had examined the brain of a child dying in status, and the one condition found at that time had been a very large subpial hemorrhage covering almost the entire brain. He would like to know whether in the brains examined by Dr. Prout similar conditions had been found. If they had, it did not seem to him fair to determine the true pathology of epilepsy from patients who have died in status. A truer knowledge of this pathology should be obtained from a study of the brains that had not undergone such secondary changes. The plates exhibited showed cellular changes such as had been reported in a number of very widely different diseases of the brain.

Dr. Schlapp said that he had seen recently a case presenting hemorrhages throughout the membranes.

Dr. Leszynsky said that fifteen years or more

ago he had published a paper entitled "Epilepsy as a Cause of Death." In every one of the cases coming to autopsy there had been intense venous stasis, and in some a few small hemorrhages. One or two of these patients died within two hours, and one after a single convulsion. A very competent pathologist had made the autopsies. At that time the most successful method of treatment of these cases had been early venesection, and he had seen no reason to change his view regarding the efficacy of this treatment. The injection of chloral into the rectum was certainly very satisfactory. He had practised venesection because of the intense venous stasis, not only found at autopsy but seen in the face of the patient.

Dr. L. P. Clark said that albuminuria had been frequently observed in the cases that they had studied, yet the quantity had varied greatly, and had not been at all in proportion to the severity of the seizures. In most of their cases there had been no systematized delusions present, and the delirium had resembled that of typhoid. A very large number of gross lesions had been found as the result of the severity of the convulsions. He had seen intense venous engorgement and hemorrhages, although sometimes these had been absent in very severe cases of status.

Dr. Prout, in closing, said he did not wish to be understood as saying that the invasion of the cortex with leucocytes is characteristic of epilepsy. It is well known that such an invasion is marked in general paresis. He had only mentioned the fact as showing that the leucocyte was carrying off effete material. In speaking of the cells of the second layer, he had referred to them as sensory in contradistinction to those which we are accustomed to associate with motor phenomena. He did not think it had been conclusively shown that these cells are associational in character. Many of the sections figured in the plates show the presence of punctate hemorrhages.

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## *NEW YORK ACADEMY OF MEDICINE.*

*Stated Meeting, Held October 18, 1900.*

The President, Wm. H. Thomson, M.D., in the Chair.

### SYMPOSIUM ON INFANT FEEDING.

**Advantages of Sterilized Milk.**—Dr. A. D. Blackader of Montreal opened the discussion. He said that the gastric digestion of infants is imperfect in that microbes which find their way into the digestive tract are not as readily destroyed and thus rendered harmless as in the adult. This barrier to the entrance of bacteria into the system not being present, sterilization of the food material supplied becomes absolutely necessary. Cow's milk is never sterile, even under the most favorable circumstances. If it is obtained from the cow with as great attention to cleanliness as possible and then immediately put on ice and kept at a low temperature until used, very few bacteria will be found in it. If these precautions are not taken, it may easily swarm with germs of various kinds. Some method of removing the bacteria is absolutely necessary. Pasteurization kills 99.8 per cent. of the microbes in full milk. It has been said that cream is more resistant to Pasteurization. Microbes that escape destruction are all of them sporebearers. The older the milk the more difficult it is to Pasteurize it.

**Preservation of Milk.**—Pasteurized milk will remain unchanged for a considerable length of time, especially if it is kept at a temperature just above 0° C. If it is not kept at this low temperature, however, fermentations are set up and these disturb infantile digestion. This liability to fermentation also occurs even in sterilized milk that has been heated up to 100° F. While Pasteurization is quite as effective as sterilization, it has no more advantages than the other process.

**Bacterial Destruction.**—All the now known pathogenic bacteria succumb to Pasteurization. The bacillus of yellow fever, of typhoid fever and of diphtheria have been shown by a number of experiments to be destroyed. Tubercle bacillus was thought to be more resistant, but Smith showed that the bacilli of bovine tuberculosis are destroyed at 140° F. if proper precautions are taken. The pellicle which forms over milk protects them so that this must be removed or the milk stirred during the heating process.

**Changes Due to Heat.**—When milk is heated certain changes which interfere with its digestibility take place. It is possible also that unheated milk may contain ferments which are an aid to digestion. In fresh milk the presence of a trypsin has been noted which is destroyed by heating. In recent years it has been found that immunity to disease in animals is not conferred upon their young by direct heredity. If the young animals are suckled by a mother who is immune to disease they acquire that immunity. The substances in the milk which confer this immunity, however, are destroyed by a heat of 60° C. These disadvantages of heating milk are now well recognized. It is necessary to choose between the two evils of a milk containing germs and one the digestibility of which has been impaired. It would seem, however, that the evils consequent upon Pasteurization are much less than those due to sterilization at a high temperature and that practically none of the pathogenic bacilli are left alive. The changes induced in the milk by Pasteurization are not very great.

**Scurvy and Artificial Feeding.**—Dr. J. P. Crozer Griffith of Philadelphia said that the American Pediatric Association had collected 379 cases of scurvy. As a member of the committee who made the report the present occasion seems a suitable one to discuss some of the features of that investigation. In 356 of the cases reported the diet of the children at the time the disease de-

veloped was given. Two hundred and fourteen of them were being fed on some proprietary food. In some cases sterile milk was used in addition to the food. In 44 of the cases some form of malted milk was employed. In 34 of the cases some brand of condensed milk was employed. In the others various of the well-known advertised foods were used. Fifty or 60 cases developed in those that were using a preparation containing insoluble starch. Altogether over 200 of the cases were receiving starch in some form in their diet. It is to be noted that this is 56 per cent. of the whole number of cases. Suspicion was aroused that the cause of scurvy was in most cases cooked or partially-cooked food which the infant's digestive organs were unable to assimilate. Several of the children, however, who developed scurvy were being fed on raw milk, while ten of them were fed exclusively on breast-milk.

**Cure of the Scurvy.**—The method of treatment employed for the cure of the disease was different in different cases. In only three was fruit-juice alone employed in addition to the diet which they had been given before. In 260 cases fruit-juice or meat-juice, together with a change in the diet, was employed. In 58 cases change of diet alone sufficed. Of these, in 24 cases, proprietary food was abandoned. In 20 of them the use of sterilized milk was abandoned. In the remaining 14 a cure followed the abandonment of starch in the diet. Two of the cases were cured by being taken from the breast and put on artificial food.

**Interesting Scurvy Cases.**—Dr. Griffith gave the details of some cases of scurvy in his own practice. In one family a pair of twins delevoped suspicious signs on the gums on the same day. These were neglected and a few days later the scorbutic hemorrhages and the painful joints developed on the same day in both children. Their symptoms yielded in a corresponding way to treatment and recovery was complete at the same time. In the treatment of scurvy it is probable that fruit-juice alone in addition to the ordinary diet will cure most cases. It does not seem probable that the scurvy is due to changes in the food produced by heat. Even if it were so it will be necessary to choose the lesser of two evils. Many infants will be protected from serious digestive troubles because of the heating of milk. A few of them will be exposed to an easily curable disease. It must be remembered that individual susceptibility plays an important rôle in the etiology of scurvy. Of two children fed on exactly the same material, one will develop scurvy, the other not. Any serious objection to continuance of sterilization can scarcely be urged from the present status of knowledge as to the connection between infant feeding and scurvy.

**Pediatrics in Europe.**—Dr. T. M. Rotch of Boston said that the discussion evoked by Jacobi's paper at the Paris International Medical Congress showed that Europeans fail utterly to appreciate what America has done in a scientific way for the advance of our knowledge of infant feeding. Monti, to whom many Americans looked as a suggestive professor in the old days, seems unconscious of the work that has been done by his students, sometimes as the result of his inspiration. It is not surprising that Europeans should neglect the work done in America in other lines of medical research, though that is one of the most disappointing features of many a European medical discussion. But that they should utterly neglect the advances made all along the line in pediatrics in America seems altogether unwarranted.

**The Use of Cereals.**—Cereals are added to milk for infant feeding supposably for two reasons—first, because of their actual nutritional value; second, because they act as digestants. The nutritional value of cereals added to infant's food is extremely problematic. Starch is probably indigestible for the infant, and even if digested its nutritional value is not as great as that of milk. There seems to be very little difference in the value of the various cereals that have been employed. Barley-water has been especially lauded by some; Heubner declares his preference for rice; others have suggested the use of other cereal solutions as diluents. White in a series of experimental researches showed that barley-water when employed as a diluent produced a finer coagulum, but when barley-water plus lime-water was used as a diluent, the coagulum was still finer. A great deal depends, however, on the constitution of the milk, especially with reference to its albuminous constituents. Where the caseinogen is in excess the coagulum will be tough and coarse no matter what the diluent. Where it is lessened in amount simple dilution will produce a fine clot. It would seem, therefore, that the addition of cereal to milk for infant feeding is not needed and that its use is irrational and unnatural.

**Emulsions.**—The making of milk emulsions for infant feeding has attracted considerable attention of late years. The practical purpose is to obtain a food by separating the cream from the rest of the milk, and then adding to the watery part as much of the separated cream and other ingredients as may be necessary to produce a food having such a composition as will be best adapted for a particular infant. As a diluent for the fluid contents of the milk, lime-water in various proportions seems to be the best agent. When milk is Pasteurized a finer coagulum is produced than when it is left untreated, so that it is the Pasteurized milk which is used as the basis of the emulsion. It has been said that the separation of the cream from the fluid milk injures the nutritional value of the milk. Especially has it been urged that when the cream is separated by a centrifugal machine, a proper union of the cream and watery solution cannot be hoped for. As a matter of fact, the amount of cream obtained from milk by the ordinary gravity process and by the centrifugal separator is exactly the same.

In a series of observations made in this matter in Boston, 16 per cent. was the average amount of gravity cream as well as of centrifugal cream. As a rule, the objections to the use of emulsions for baby feeding come from those who have had least experience with them.

**Proteids of Milk.**—The estimation of the lactalbumen of milk does not give the total proteids. The amount of the two principal elements which enter into the proteids, namely, the lactalbumen and the caseinogen, varies at different periods of life and under changing circumstances. There is nearly always an increase of lactalbumen in infant's food demanded by the increasing age of the infant. This lactalbumen may be obtained very readily and in a suitable form from whey. The caseinogen may be obtained from milk. With an emulsion, the ingredients and amounts of which have been properly collected for a given case, there is no need to add cereals. Pasteurization of such an emulsion when made from fresh, clean materials is needed only if the emulsion is to be sent to a distance. After Pasteurization the material will stand transportation for long distances and yet remain sterile. Samples have been sent from the laboratory in Boston to Vienna and have arrived fresh. The doing away with Pasteurization removes certain objections that militate against the use of heat-prepared foods.

**Selection of Wet-Nurse.**—Dr. L. Emmett Holt, of New York, said that it is a matter of surprise to many that it should be so difficult a problem to provide a suitable food material for infants. Those who have had experience with the selection of a wet-nurse soon learn to realize how difficult it is to obtain even the proper quality of food for an infant when it is supplied in Nature's own way. It may be necessary sometimes to try as many as ten or twelve women before a suitable nurse, especially for a delicate child, can be obtained. It is no wonder, therefore, that the modification of milk for infant feeding is a very difficult matter and may require under delicate conditions the greatest amount of care in order to secure a suitable article. It must be admitted that breast-milk is the ideal food for the infant. All substitutes must imitate it. The nearest approach to it can be obtained by some modification of fresh cow's milk. The proportions in which the various ingredients exist in cow's milk are so different from those of mother's milk that considerable modification may be required. The oldest idea, and it has proved not unsuitable in numberless cases during the centuries, was to add water and a certain amount of sugar for the taste. The effort at present is to bring cow's milk more nearly to the average proportion of mother's milk.

**Infant Food Formulae.**—No single formula for the modification of milk will do general duty for all infants indiscriminately. The result of investigations has been not to prepare a food, but rather a method of feeding. The endeavor is to find the elements that are in unsuitable proportions for a given child and then to modify the milk so as to render it digestible and nutritious. In an individual infant suffering from indigestion, it may not be the milk itself, but some ingredient of it which is indigestible. The fats or the proteids, for instance, of a given sample may prove indigestible. If the errant ingredient can be found, its reduction in quantity may make the food digestible once more. For a long while, despite the theoretic promises of this method, success in its use was not very marked. The future looks brighter, however, for infant feeding now that we understand the practical difficulties as well as the theoretically-correct principles.

**Four Elements of Success.**—There are four factors that make for successful infant feeding with modifications of cow's milk. First, one must have the best fresh milk; too long a time must not have elapsed since it has been obtained from the cow; special precautions must have been taken to keep it clean, and it should have been preserved on ice from the moment of the milking until it is to be used. Second, there must be intelligent cooperation. Definite and minute directions must be given in writing as to the quantities to be employed in the preparation of the infant's food and the times of feeding. Third, personal supervision is necessary to see that orders are carried out. Fourth, every routine of the nursery must be scrutinized. Every point of sanitation must be carefully looked to, the conditions of air and light and cleanliness and clothing and the household surroundings must be examined.

**Infant Indigestion.**—The digestive disturbances of infants can be divided into two general classes. The indigestion of healthy infants and that of unhealthy infants. In healthy infants all digestive disturbances resemble one another more or less and can be treated on certain general principles. Of the digestive disturbances of unhealthy infants, the name is legion. Nothing is more puzzling or full of surprises than the many-featured phases of digestive symptoms that occur in infants once their digestive function has become chronically affected.

**Method of Milk Modification.**—For the rational modification of cow's milk, the approximate composition of ordinary milk must first be ascertained and then what is needed in addition to this for the infant's nutrition. At different periods of its life the child will need varying amounts of certain ingredients. The simplest method of preparing these modifications seems to be to take the milk, as it can be ordinarily obtained by a city family. In ordinary bottled milk the cream rises to the top and enables us to recognize what proportion of fatty material is contained in the food, as it is prepared for the infant. During the first few months of life the ordinary infant should receive about one-half milk and one-half cream. This can be best obtained by taking the upper third of the bottle of milk as it is ordinarily supplied by city dairies. During the second period

of the baby's life, that is, from about three to nine months an increase of the proteids is needed with about the same amount of fat, though proportionately to the whole of the food taken by the infant this represents a decrease in the fats. For this the upper half of the bottle of milk should be employed. After the ninth month the baby can be fed with the whole milk. As the baby grows the quantity of food given should be increased. This can be done by increasing the amount given at each feeding without any other modification than that suggested for the different periods. It is often true that delicate children are kept on too low a diet of proteids, because of too great dilution of the milk.

**Standard Food Formula.**—The food of an infant should not be ordered on general principles according to its age or weight. The digestive condition of the infant is much more important as regards the regulation of the quantity and quality of food that it should take than anything else. The infant's appetite should not be abused. Needless to say it should not be fed every time that it cries. The first symptom of digestive disturbances should be carefully looked for and precautions taken at once to prevent their becoming inveterate to the slightest degree. As soon as fretfulness and sleeplessness assert themselves something should be done immediately to avoid the digestive disturbance that threatens. The first food prescription given an infant should be considered experimental rather than definite. It is much easier to give too much than too little food. Begin with low percentages of all the ingredients and raise these as it seems necessary rather than the opposite course. An excess of fat especially is liable to disturb the infant's digestion and bring on the train of symptoms which may lead irretrievably to the obstinate indigestion that precedes marasmic conditions.

**Breast-Fed and Artificially-Fed Infants.**—In the discussion Dr. J. S. Winters, of New York, said that the contrast between the breast-fed and the artificially-fed infant is most striking. While the nursing child is almost never sick, the artificially-fed infant seems almost never to be well. It is the exception to find a healthy child that has been fed on the bottle. Statistics seem to show that while 8 per cent. of breast-fed infants die before the end of the first year, 51 per cent. of artificially-fed infants perish before they reach the same age. These are the statistics for private families. In institutions the bottle-fed infants fare still worse. In the Charité Hospital at Berlin from 59 to 93 per cent. of the infants under treatment die. At Budapest, where the same class of infants are in a hospital, only 15 per cent. of the infants die because mothers are required to nurse their own children, or wet-nurses are supplied. There is no question, therefore, but that as far as possible human milk should be the food of the young infant.

**Cereals in Infant's Food.**—Clinical experience as well as our theoretic knowledge of the infant's digestive organs make it clear that the addition of cereals to the infant's diet is irrational. The nearest approach to mother's milk is cow's milk. It has about the same ingredients and in nearly the same proportions and, moreover, it is of animal origin and so is a more natural food than any vegetable product. One of the great difficulties in city life is to obtain cow's milk, pure and fresh. There would certainly be much less difficulty in the feeding of infant children in our large cities if we could always obtain fresh cow's milk. Digestive disturbances begin as a result of the ingestion of low-grade, contaminated milk and then almost any food, no matter how suitable, becomes impossible of digestion for the child.

**Natural Milk.**—It must be remembered that many infants bear ordinary, absolutely unmodified cow's milk very well. For such infants dilutions will do harm because they will prevent the infant from obtaining its full complement of food as easily as it should. If fresh milk can be obtained it is better to give it raw than Pasteurized. Undoubtedly the application of heat to milk, either at high temperatures or at lower temperatures, over long periods, produces changes in the milk which make it difficult of digestion. When cream is to be added to milk gravity cream and centrifugal cream amount to the same thing.

**Cereals Not Irrational.**—Dr. Chapin said that cow's milk is a radically different substance from mother's milk. The more the two forms of milk are studied, the more is this realized. Cereals are not any more foreign to the infant's digestive organs than is cow's milk itself. The talk about its irrationality because of its being a foreign substance is therefore groundless. There is no doubt that it does good by making the coagulum of the milk finer and less tenacious. This mechanical advantage every one admits. If the cereal gruel be dextrinized before being added to the milk there need be no fear about its digestibility. When the coagulum of the milk is finer much more of the surface of the clotted portions is exposed to the action of the digestive juices. Not only this but the curd of milk produced by digestive action in the presence of a cereal are always much more porous than when cereals are absent, and so the gastric juice is able to penetrate them.

**Mother's Milk Not Sterile.**—Dr. R. G. Freeman said that mother's milk is usually not sterile. Frequently her nipple is infected and is cleaned only by the baby's tongue. Even in the human breast some bacteria exist and find their way into the milk.

**The Curdling of Milk.**—Dr. T. M. Rotch, of Boston, said that the reason for the differences between the coagulum of cow's milk and that of mother's milk is the presence of more caseinogen in cow's milk. The caseinogen might easily be increased in mother's milk, however, and then the curd produced by the digestive juices would be coarse and tenacious. Every doctor has seen mother's milk thrown up in reasonably large, tenacious curds.